Why do I Keep Checking my Facebook?
The Role of Urge in the Excessive Use of Social Networking Sites

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Abstract
With the advance of information technologies and widespread deployment of data services, users can access social networking sites (SNSs) almost anytime and anywhere, resulting in an incessant urge to check SNSs. Till now, little is known about the precursors of urge and its role in the development of SNS excessive use. Therefore, we proposed and tested a research model that examines the role of urge in checking SNSs. Empirical evidence from a survey of 205 respondents showed that instant gratification and withdrawal are important factors of the urge to check SNSs, the urge to check SNSs was found to have a significant impact on the excessive use. We concluded with implications to research and practice.

Keywords: Social Networking Sites, Excessive Use, Urge to Check, Facebook

1. Introduction
Today, social networking sites (SNSs) pervade almost every aspect of our daily social interactions. Billions of users are socializing on the platforms every day, updating their personal status, posting photos or videos, sharing news, or chatting with their networks of friends. The penetration rate of online social networking services worldwide has been reaching new heights. There will be around 1.82 billion SNS users around the globe by 2014, and the number of users is expected to grow to 2.33 billion by 2017 [1].

With the advance of the functions and features of SNSs, the use of SNSs has become problematic for some users. Particularly, SNSs keep introducing new features that entice users to check up their SNSs regularly, resulting in spending excessive amount of time. For example, the real-time stream feature in Google+ allows users to receive updates from members of their circles instantaneously [2]; the direct-response Ads function in Twitter enables users to stay in touch with their favorite brands [3]. Being the most popular social networking site, Facebook offers various functions which encourage online interaction and engagement. Besides some basic functions that commonly found in SNSs, such as instant messaging, real-time notification, giving “Like”, or tagging, Facebook has recently introduced an audio-recognition feature that allows users to tag music, TV shows or movies they are listening or watching and post them on their timeline automatically. Furthermore, Facebook adds the “Nearby Friends” function that enables users to locate their current location as well as their friends’ locations instantly. Finally, the “hashtag” feature of Facebook also provides users with ample opportunities to discover interesting and trendy topics and conversations from their network of friends [4].

These advanced features of SNSs and the increasing deployment of mobile devices and data services make it hard for some users to resist the urge to check up their SNSs accounts or stalk friends’ life day and night. The dark side of using SNSs has recently been attracting a lot of attention in the IS community [5-9]. With the consideration of the rapid development of addictive features of SNSs, we attempt to explore the development of urge as well as its impact on the problematic use of SNSs. In this study, we define the urge to check SNSs as the feeling of being impelled to check SNSs [5]. We build upon the cognitive model of urge [10, 11] and develop our research model to explain the excessive
use of SNSs. The objectives of this study are twofold: (1) to examine the factors associated with the urge to check SNSs, and (2) to investigate the development of excessive use of SNSs and its corresponding negative outcomes from the urge perspective.

We believe that this study will provide both research and practical implications. On the theoretical side, we advance the theoretical understanding of the role of the urge in the development of excessive use of SNSs through the theoretical lens of the cognitive model of urge. On the practical side, the findings will help developers understand the factors associated with the development of urge. This may provide them with some guidelines in designing features that help alleviate the problem of excessive use.

We structure the paper as follows. In the next section, we provide a review of prior literature on the use of SNSs and address prior research work on urge and addictive behavior. Then, we draw upon the cognitive model of urge, and propose a research model explaining the role of urge in excessive SNS use. Subsequently, we outline the research methodology for validating the research model and hypotheses. Based on the empirical evidence, we summarize the key findings and conclude the paper with a discussion of the implications for research and practice, limitations, and directions for future research.

2. Theoretical background

2.1. Use of social networking sites

The proliferation of SNSs has captured the attention from researchers of different disciplines. Early studies on SNSs mainly focused on the positive side of SNS use. For instance, a group of researchers focused on investigating various motivations to use SNSs, such as maintaining offline contacts, meeting new people, seeking information, and having fun [e.g., 12-14]. Another group of researchers examined diverse issues and phenomena related to the use of SNSs, such as adoption and use [e.g., 15, 16], posting behavior [e.g., 17], gender effect [e.g., 18], and social influence [e.g., 19]. These existing works were largely built on the theoretical traditions of planned behavior and reasoned action, and the expectation disconfirmation framework.

In recent years, we have witnessed an exponential growth of studies concerning the dark side of SNS use [e.g., 7, 9, 20, 21]. As shown in Table 1, the investigation of addictive use of SNSs mainly focused on the demographic characteristics, usage level and personality traits [e.g., 22-26]. For example, Andreassen et al. [22] used the five-factor model of personality to investigate the association between personality traits and Facebook addiction. The study reported that extroversion was positively associated with Facebook addiction, while openness to experience and conscientiousness were negatively associated with Facebook addiction. Wu et al. [27] applied social cognitive theory to study SNS addictive tendencies. They found that those who spent more time on SNSs reported higher degrees of addictive tendency. Existing studies have provided us with a descriptive overview of the phenomenon. However, little is known about the theoretical foundation explaining the development of addictive use of SNSs.

2.2. Urge and addictive behavior

In common parlance, urge is described as “a feeling of being impelled to do something” [5]. It is often characterized by a spontaneous, irresistible and sudden desire to perform a behavior [28]. While realizing an urge could bring pleasant experience to an individual, failure in managing the incessant urge could potentially lead to the occurrence of a wide range of problematic behaviors [29], including cigarette craving [30], binge eating [31], pathological gambling [32], and problematic mobile use [33].

Considerable efforts have been devoted to understand the relationships between urge and addictive or problematic behaviors in prior literature. For instance, Marlatt [10] developed the social learning model of addictive behaviors and suggested that the urge to perform addictive behaviors comes from two distinctive origins: (1) anticipation of euphoria, and (2) anticipation of relief from withdrawal symptom. Tiffany and Drobes [34] also proposed the cognitive model of urge and suggested that (1) the expected pleasure, and (2) expected relief from withdrawal symptom of performing certain activities give rise to addictive behaviors. In other words, the urge to perform certain behavior is driven by cue-response associations, which is highly automated. Based on our review of prior urge literature and problematic behavior, the urge to perform certain behavior is basically driven by two major factors: instant gratification and withdrawal.
Table 1. Summary of literature on addictive use of SNSs (Sample of studies)

<table>
<thead>
<tr>
<th>Reference</th>
<th>Theory</th>
<th>Research design (Sample size)</th>
<th>Main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andreassen et al. [22]</td>
<td>Five-factor model of personality</td>
<td>Survey (n=218)</td>
<td>The authors found that extroversion was positively associated with Facebook addiction, while openness to experience and conscientiousness was negatively associated with Facebook addiction.</td>
</tr>
<tr>
<td>Balakrishnan and Shamim [23]</td>
<td>Uses and gratifications theory</td>
<td>Survey (n=707)</td>
<td>The authors found that Malaysian students use Facebook actively, similar to other studies done worldwide. Factor analyses yielded five motives to use Facebook: Social Networking, Psychological Benefits, Entertainment, Self-Presentation and Skill Enhancement.</td>
</tr>
<tr>
<td>Choo Cheak et al. [35]</td>
<td>NIL</td>
<td>Survey (n=343)</td>
<td>The authors found that social phobia/anxiety and social networking motives have a significant positive correlation with online social networking addiction.</td>
</tr>
<tr>
<td>Kuss and Griffiths [36]</td>
<td>NIL</td>
<td>Literature review</td>
<td>The authors provided a review on the emerging phenomenon of addiction to SNSs.</td>
</tr>
<tr>
<td>Pelling and White [37]</td>
<td>Theory of planned behavior</td>
<td>Survey (n=233)</td>
<td>Attitude and subjective norm significantly predicted intentions to engage in high-level SNS use. Self-identity and belongingness significantly predicted addictive tendencies toward SNSs.</td>
</tr>
<tr>
<td>Turel and Serenko [7]</td>
<td>Neural sensitization</td>
<td>Survey (n=194)</td>
<td>Perceived enjoyment facilitates the development of a strong habit that can help forming a strong pathological and maladaptive psychological dependency on the use of SNSs.</td>
</tr>
<tr>
<td>Wilson et al. [38]</td>
<td>Five-factor personality model</td>
<td>Survey (n=201)</td>
<td>The authors found that extraverted and unconscientious individuals reported higher levels of both SNS use and addictive tendencies.</td>
</tr>
<tr>
<td>Wu et al. [27]</td>
<td>Social cognitive theory</td>
<td>Survey (n=3277)</td>
<td>The authors found that those who spent more time on SNSs also reported higher addictive tendencies. Addictive tendencies were positively correlated with both outcome expectancies and impulsivity, but negatively associated with Internet self-efficacy.</td>
</tr>
</tbody>
</table>

3. Research model and hypotheses development

In this study, we build upon the cognitive model of urge to develop our research model and hypotheses. Figure 1 depicts our proposed research model. Given the real-time update of personalized contents and widespread deployment of information communication technologies, users may experience an incessant urge to check their SNS accounts. Checking SNSs gratifies users’ need for information updates and social connection. At the same time, users may experience unpleasant feelings when they are not able to check their SNSs. Thus, we believe that instant gratification and withdrawal are important factors associated with the urge to check SNSs. Furthermore, the failures to manage the incessant urges to check up the SNS accounts may eventually lead to excessive use and result in negative outcomes.

3.1 Instant gratification, withdrawal and the urge to check SNSs

According to the cognitive model of urge [34], the feeling of urge is highly associated with the expectation on pleasure and/or the feeling of urgent need linked with withdrawal symptoms [10, 11]. Instant gratification refers to the degree of immediate gratification users experience when they are checking their SNS accounts [39]. The relationship between instant gratification and the urge to check SNSs is novel. There is no empirical investigation into its relationship in the context of SNS use. Yet, in a recent study conducted by Liu et al. [39], instant gratification is found to be an important factor of the urge to purchase at an e-commerce website. We expect that this relationship in the context of SNS use should be held. Withdrawal refers to the unpleasant feeling state users experience when they are not able to check their SNS accounts [40]. Psychological distresses arise when users are forced to unplug from their SNSs [42]. Denti et al. [43] found that more than 20% of the respondents would feel ill if they were unable to check their SNSs. Young and De Abreu [44] also indicated that users become obsessive when they do not receive notifications from SNSs. Thus, users are likely to experience unpleasant feelings when checking of SNSs is discontinued or suddenly reduced. Thus, we hypothesize that:

*H1: Instant gratification is positively associated with the urge to check SNSs.*

*H2: Withdrawal is positively associated with the urge to check SNSs.*
3.2. The urge to check and the excessive use of SNSs

Following prior literature [45, 46], we define excessive use of SNSs as the extent to which users perceive the time spent on checking SNSs excessive. People have a universal need to connect with others. Checking SNSs is convenient and almost effortless to many users who own mobile devices and data services. However, when they are not able to control the amount of time they have spent in checking SNSs, it is very likely that they will spend excessive amount of time on SNSs.

Urge has been considered as an irreplaceable determinant of addictive behavior [47, 48]. Lejoyeux et al. [49] suggested that failure in resisting urge constitutes to the formation of behavioral addiction. Cyders and Smith [50] indicated that the feeling of urge is an influential factor of an individual’s proneness to engage in various addictive behaviors. In a similar vein, if users experience an incessant urge to check SNSs, they are more likely to develop excessive use of SNSs. Thus, we hypothesize:

H3: The urge to check SNSs is positively associated with the excessive use of SNSs.

3.3. The excessive use of SNSs and negative outcomes

SNSs are the most popular Internet destination for the online population nowadays. Social networking takes up the most of users’ online time, soundly trouncing checking email, watching video, web surfing and online gaming [51]. For users who spend a significant amount of time on SNSs, they are likely to deprive their time for other physical, interpersonal, or professional activities, causing negative impacts on their health, social relationship, and professional/academic performance. Porter et al. [52] reported that video gamers who play excessively are likely to experience different negative outcomes. In the same vein, we believe that users who devote excessive amount of time on SNSs are more likely to experience negative outcomes pertaining to different aspects of their lives. Thus, we hypothesize:

H4: The excessive use of SNSs is positively associated with negative outcomes.

4. Methodology

4.1. Measures

We derived the measures from prior literature with minor modifications to fit the context of SNSs. Multiple measurement items were used for each construct. All items were measured with seven-point Likert scale, with “1 = Strongly Disagree” to “7 = Strongly Agree”. Respondents were asked to indicate to which extent they agree with the statements. The complete list of measurement items for constructs is shown in Table 2.

4.2. Pre-test

We conducted a pre-test with 10 undergraduate and postgraduate students to solicit feedback on the questionnaire and measurement items. In particular, we verified (1) clarity of the wordings, (2) relevance of the items, (3) formatting of the questionnaire, (4) absence of biased words and phrases, and (5) clarity of the instructions. Other than minor formatting modifications, no major problems were surfaced.

4.3. Data collection

We posted advertisements in a university in Hong Kong to recruit active Facebook users to participate in our study. We administered the online questionnaire in a computer laboratory. Respondents were awarded with a HKD 50 shopping coupon as an incentive for participation. We collected 225 responses in the data collection.
Four items were chosen to measure excessive use of SNSs, including: (1) losing track of time when on Facebook; (2) using Facebook over longer periods of time than intended; (3) spending a good deal of time on Facebook; and (4) experiencing strong urges to check Facebook.

Three items were chosen to assess the negative outcomes of Facebook use, including: (1) making it difficult to manage life; (2) creating problems in life; and (3) missing social engagements or activities because of Facebook use.

Urge to Check SNSs
- UC1: Experienced strong urges to check Facebook.
- UC2: Felt a sudden urge to check Facebook.
- UC3: Experienced a number of sudden urges to check Facebook.

Instant Gratification
- IG1: Checking Facebook brings immediate enjoyment.
- IG2: Would feel pleased instantly when checking Facebook account.
- IG3: Would feel excited immediately when checking Facebook account.

Withdrawal
- WD1: Feel bad when unable to check Facebook.
- WD2: Become angry when unable to check Facebook.
- WD3: Become stressed when unable to check Facebook.

Twenty responses were deleted due to perfunctory answering (i.e., choosing answers down the same column on a page), yielding a sample of 205 valid responses for subsequent analyses. Facebook is now the most popular social networking sites worldwide. As such, it has a high external validity, where the results from this study can be generalized to other settings. Further, Hong Kong has its highest Facebook penetration rate in the world (60.1%) [55], making Hong Kong Facebook users as an appropriate sample in this study.

4.4. Respondent profile

The sample comprised 50.7% male and 49.3% female. The majority of respondents aged between 18 and 25. More than half of the respondents had at least five years of experience in Facebook, and they used Facebook several times a day. The average number of visits was 7.28 per day, and the average time per access was 18.28 minutes. Table 3 summarizes the descriptive statistics for the respondents.

Our sample complies with general Facebook user demographics in many countries: the dominant group of Facebook users (83%) are young adults aged 18-29. In terms of education attainment, 73% of the users had a college degree. Consistent with previous discussion, the current sample shared similar demographic characteristics as of the dominant Facebook group user [55]. Thus, we believed that it is a representable and appropriate sample for the current investigation.

5. Data analysis

5.1. Preliminary assessment

We conducted two preliminary tests. First, as we adopted a self-reported questionnaire, common method bias may be a threat. Thus, we performed Harman [56] one-factor extraction test [57]. The result showed that no single factor accounted for more than 50% of the total variance explained, implying that common method bias is not a threat in this study [58].

Second, as respondents are likely to portray themselves in a favorable light by responding in a socially approved way with a potential under-reported level of excessive use [7], we used the established measures [59] to assess the social desirability bias. We calculated the Spearman’s correlations between the excessive use of SNSs and the social desirability bias scores. We obtained the following correlation: \( \rho = -0.121 \) (\( p > 0.05 \)). Since there is no significant correlation, social desirability bias is not a concern in this study.
5.2. Test of measurement model

We used partial least square approach to test our research model. PLS is preferred in this study because it possesses the ability in analyzing data with non-normality [60, 61], which is the case of this study as data of problematic behaviors are skewed [61].

The test of the measurement model involves the estimation of internal consistency as well as the convergent and discriminant validity of the measurement items included in our survey instrument. Convergent validity indicates the extent to which the items of a scale that are theoretically related to each other should be related in reality. It is examined by use of the composite reliability (CR) and the average variance extracted (AVE). The critical values for CR and AVE are 0.70 and 0.50 respectively [60]. As summarized in Table 4, all CR and AVE values fulfill the recommended levels, with the CR ranging from 0.84 to 0.92 and the AVE ranging from 0.64 to 0.80. Further, all item loadings meet the recommended level of 0.70.

<table>
<thead>
<tr>
<th>Table 4. Psychometric properties of measures</th>
<th>Item</th>
<th>Mean</th>
<th>S.D.</th>
<th>Loading</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessive Use of SNSs (CR = 0.85; AVE = 0.65)</td>
<td>EU1</td>
<td>3.74</td>
<td>1.63</td>
<td>0.76</td>
<td>22.23</td>
</tr>
<tr>
<td></td>
<td>EU2</td>
<td>4.65</td>
<td>1.46</td>
<td>0.82</td>
<td>25.95</td>
</tr>
<tr>
<td></td>
<td>EU3</td>
<td>4.27</td>
<td>1.53</td>
<td>0.84</td>
<td>35.63</td>
</tr>
<tr>
<td>Negative Outcomes (CR = 0.84; AVE = 0.64)</td>
<td>NO1</td>
<td>3.10</td>
<td>1.46</td>
<td>0.86</td>
<td>42.15</td>
</tr>
<tr>
<td></td>
<td>NO2</td>
<td>2.80</td>
<td>1.40</td>
<td>0.75</td>
<td>15.01</td>
</tr>
<tr>
<td></td>
<td>NO3</td>
<td>2.50</td>
<td>1.26</td>
<td>0.79</td>
<td>22.16</td>
</tr>
<tr>
<td>Urge to Check SNSs (CR = 0.91; AVE = 0.77)</td>
<td>UC1</td>
<td>5.01</td>
<td>1.45</td>
<td>0.86</td>
<td>34.85</td>
</tr>
<tr>
<td></td>
<td>UC2</td>
<td>5.01</td>
<td>1.38</td>
<td>0.90</td>
<td>53.45</td>
</tr>
<tr>
<td></td>
<td>UC3</td>
<td>4.48</td>
<td>1.53</td>
<td>0.87</td>
<td>44.44</td>
</tr>
<tr>
<td>Instant Gratification (CR = 0.91; AVE = 0.77)</td>
<td>IG1</td>
<td>4.80</td>
<td>1.13</td>
<td>0.86</td>
<td>31.06</td>
</tr>
<tr>
<td></td>
<td>IG2</td>
<td>4.26</td>
<td>1.21</td>
<td>0.93</td>
<td>40.25</td>
</tr>
<tr>
<td></td>
<td>IG3</td>
<td>3.88</td>
<td>1.22</td>
<td>0.84</td>
<td>19.84</td>
</tr>
<tr>
<td>Withdrawal (CR = 0.92; AVE = 0.80)</td>
<td>WD1</td>
<td>3.58</td>
<td>1.54</td>
<td>0.91</td>
<td>48.02</td>
</tr>
<tr>
<td></td>
<td>WD2</td>
<td>2.69</td>
<td>1.35</td>
<td>0.88</td>
<td>31.44</td>
</tr>
<tr>
<td></td>
<td>WD3</td>
<td>2.84</td>
<td>1.45</td>
<td>0.88</td>
<td>30.19</td>
</tr>
</tbody>
</table>

Notes: CR = Composite Reliability; AVE= Average Variance Extracted

Discriminant validity is the extent to which the measurement is not a reflection of some other variables. It is indicated by low correlations between the measure of interest and the measure of other constructs [62]. Evidence of discriminant validity can be demonstrated when the squared root of the average variance extracted (AVE) for each construct is higher than the correlations between it and all other constructs. As shown in Table 5, the square root of AVE for each construct is greater than the correlations between them and all other constructs. Further, all item’s loading on a construct is higher than all of its cross loadings with other constructs (see Table 6). The results suggest a satisfactory discriminant validity of all measurements.

<table>
<thead>
<tr>
<th>Table 5. Correlation matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
</tr>
<tr>
<td>EU</td>
</tr>
<tr>
<td>NO</td>
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<tr>
<td>UC</td>
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<tr>
<td>IG</td>
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<tr>
<td>WD</td>
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</tbody>
</table>

Notes: (1) EU = Excessive Use of SNSs, NO = Negative Outcomes, UC = Urge to Check SNSs, IG = Instant Gratification, WD = Withdrawal; (2) italicised diagonal elements are the square root of AVE for each construct. Off-diagonal elements are the correlations between constructs.

<table>
<thead>
<tr>
<th>Table 6. Cross loadings of key constructs</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
</tr>
<tr>
<td>EU1</td>
</tr>
<tr>
<td>EU2</td>
</tr>
<tr>
<td>EU3</td>
</tr>
<tr>
<td>NO1</td>
</tr>
<tr>
<td>NO2</td>
</tr>
<tr>
<td>NO3</td>
</tr>
<tr>
<td>UC1</td>
</tr>
<tr>
<td>UC2</td>
</tr>
<tr>
<td>UC3</td>
</tr>
<tr>
<td>IG1</td>
</tr>
<tr>
<td>IG2</td>
</tr>
<tr>
<td>IG3</td>
</tr>
<tr>
<td>WD1</td>
</tr>
<tr>
<td>WD2</td>
</tr>
<tr>
<td>WD3</td>
</tr>
</tbody>
</table>

5.3. Test of structural model

We performed bootstrapping procedures to test the significance of relationships in the structural model. Figure 2 illustrates the results of the structural model analysis.

The relationships between instant gratification, withdrawal, the urge to check SNSs, the excessive use of SNSs, and negative outcomes are upheld by the empirical evidence. Instant gratification (β = 0.32, p < 0.001) and withdrawal (β = 0.20, p < 0.01) exert positive and significant effects on the urge to check
SNSs. Together, the two key factors explain 18% of the variance in the urge to check SNSs, supporting hypotheses 1 and 2. The urge to check SNSs ($\beta = 0.48$, $p < 0.001$) is a positive and significant factor of the excessive use of SNSs, explaining 22% of the variance and supporting hypothesis 3. The excessive use of SNSs ($\beta = 0.48$, $p < 0.001$) is a positive and influential factor of negative outcomes. It explains 23% of the variance, supporting hypothesis 4.

6. Discussion and conclusion

This study aims to provide a theory-guided framework to investigate the precursors of urge to check SNSs and the role of urge in the development of excessive use of SNSs. Building on the cognitive model of urge, we proposed and empirically tested a research model with a sample of 205 respondents. The research model and hypotheses are well-supported by our empirical data. The findings confirm that instant gratification and withdrawal are important factors that influence the urge to check SNSs. The urge to check in turn increases the likelihood of developing the excessive use of SNSs and resulting in different negative outcomes.

6.1. Implications for research and practice

This study yields important theoretical and practical contributions. On the theoretical side, we investigate the dark side of SNS use in a theoretical guided approach. To the best of our knowledge, this is one of the first studies that examine the excessive use of SNSs from the urge perspective. This study is believed to provide a solid foundation for future research to investigate the dark side of SNS use.

Our study also adds knowledge to the IS literature by identifying the factors associated with the urge to check SNSs. Building on the cognitive model of urge, we found that instant gratification and withdrawal are salient factors that trigger the urge to check SNSs, and the urge to check SNSs increases the likelihood of developing excessive use. Our study also confirmed the relationship between excessive use and negative outcomes as demonstrated in the prior literature [46].

On the practical side, this empirical investigation is timely to enhance our understanding of the urge to check SNSs, a seemingly universal yet unexplored phenomenon. Our study delineates an overall picture on the development of excessive use of SNSs from the theoretical lens of urge. The urge to check SNSs rises from two distinct origins, one from an anticipated of pleasure from the behavior (e.g., instant gratification), and one from a feeling of urgent need linked with withdrawal symptoms (e.g., withdrawal). This finding is important to educators in developing programs that aim at regulating SNS usage.

Our results also raise awareness among SNS developers the potential threats of the excessive use of SNSs. Besides introducing interactive functions and features that entice users to return to the platform, SNS developers should also consider the corporate social responsibility and develop in-site functions or plug-in applications to help users better manage the time they spend on the platforms.

6.2. Limitations and future research directions

Several cautions should be taken into account in the interpretation of the empirical findings of this study. First, this study adopted a student sample to test the theoretical model. Although university students are the most frequent group of SNS users, the inclusion of other groups of users will enhance the generalizability of the study. Future studies should consider a more comprehensive and sophisticated sampling method, such as including participants of various ages and occupations, to increase the representativeness of the results.
Second, despite the all the hypotheses being supported, our research model suffers from a relatively small portion of variance explained in the dependent variables. Future studies should incorporate other variables to yield a more comprehensive view on the phenomenon. For example, researchers could include different kinds of urge to use SNSSs, such as the urge to check and the urge to post, into the research model, and investigate the factors associated with the specific types of urge. Further, researchers could also test the relatively impacts of different kinds of urge on the development of excessive use of SNSSs.

Third, research on problematic or addictive use of technologies has drawn increasing attention among IS researchers, but there is still a lack of consistency in the conceptualization and operationalization of the key constructs [44]. Researchers should devote more effort to elucidate the conceptualization and operationalization of key constructs pertaining to the phenomenon.

7. Acknowledgement

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