

Are People Addicted to Social Networks?

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ABSTRACT

The popularity of social networking sites (SNSs) has increased rapidly. SNSs are a key part of daily life for many people around the world. The use of SNSs is already a global phenomenon. Drawing on social capital theory, this research empirically explored how structural capital (social network ties), relational capital (trust in SNSs, trust in members of SNSs, social identification, and social norms), and cognitive capital (shared language and shared goals) influence stickiness, which in turn affects addiction. This study introduced key moderators, privacy concerns and perceived security, to the relationship between stickiness and addiction. The authors empirically evaluated the proposed model by using survey data collected from SNS users. Structural equation modeling was applied to test the model. This study can provide a deeper understanding of SNS users' addiction behavior by focusing on social capital theory, privacy concerns, and perceived security and therefore contribute to both research and practice.

KEYWORDS

Addiction, Privacy Concern, Security, Social Capital Theory, Social Media, Social Networking Sites, Stickiness

ARE PEOPLE ADDICTED TO SOCIAL NETWORKS?

More than 4.2 billion people (or 53% of the global population) use social media (DataReportal, 2021). With the onset of COVID-19 and the drastic reduction in outings and gatherings, social networking sites (SNS) have assumed a more crucial role in daily life as people use them to connect with others (Business Insider, 2020). These social sites are an Internet success story. They have been adopted as a vital means of communicating, interacting, and sharing with others, thereby increasing interpersonal sociability and connectivity (Hajli et al., 2017; Krasnova et al., 2017). This public forum enables the exchange of digital information like text, pictures, audio, and video (Aichner et al., 2021).

The rapid growth of SNS users has attracted marketing and advertising interest from firms that seek online exposure and increased brand loyalty. Most SNS depend on online advertising as their main source of revenue; thus, they enhance network externalities to achieve economies of scale to propagate their business model (Beullens & Vandenbosch, 2016; Sledgianowski & Kulviwat, 2009). In turn, the increased use of SNS generates profit.

The popularity and growth of commercial SNS are considerable. New and specialized SNS have emerged, further signifying the success of this new business model. Although the total number of

DOI: 10.4018/JGIM.322778

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SNS has grown at an astonishing rate, some networks have lost users or been discontinued because of fierce competition. The main business strategy for SNS practitioners is to retain existing users and attract new users.

Studies have explored the main functions of SNS in terms of social networking (Mendez et al., 2020), impression management (Lee & Jang, 2019), self-presentation in profiles (Djafarova & Trofimenko, 2017), proliferation of special interest networks (Mellins, 2008; Oomen, 2020), gender differences (Krasnova et al., 2017; Lin & Wang, 2020), and social network structure (Holme et al., 2004; Shi & Whinston, 2013). However, few studies have been conducted on factors that influence user addiction to SNS. Empirical studies are needed to address the popularity of SNS and increase in SNS addiction. The current study was motivated by a broad interest in SNS addiction. In addition, numerous SNS privacy and security issues merit serious consideration. This is the first study to apply the social capital theory and explore the moderating influences of both privacy concerns and perceived security in SNS addiction.

The notion of social capital was originally used to describe relational resources embedded in interdisciplinary personal relationships that support the development of social communities (Loury, 1977). It is an elastic construct used to describe the benefits of relationships with others (Lin, 1999). The concept of social capital began with the formation trust within social communities and human interactions (Woolcock, 1998). Social capital is a pool of resources that can be harnessed through social connections embedded in social networks (Wang & Chiang, 2009). SNS enable people to display themselves, express their social network, and develop relationships with others.

Intense SNS use is closely associated with the maintenance and formation of social capital (Ellison et al., 2007). SNS support both the maintenance of existing social connections and formation of new ones. Tang et al. (2012) stated that social capital on SNS affects information exchange and personal well-being. However, few empirical studies have addressed whether people use SNS to maintain existing connections or make new ones. Thus, this study applies the social capital theory to explore privacy and security of SNS through the development and empirical testing of a theoretical research model of addiction.

The framework of Nahapiet and Ghoshal (1998), which integrated prior work in the field, provides three specific dimensions of social capital: (1) structural; (2) relational; and (3) cognitive. A behavioral research model of the relationships among structural capital (social network ties), relational capital (trust in SNSs, trust in members of SNSs, social identification, and social norms), cognitive capital (shared language and shared goals), and addiction to SNSs was developed. This research model was used to empirically examine how social capital is fostered within an SNS through communication and interaction among users. In addition, this study examined how stickiness mediates the relationships between social capital and addiction to SNS.

Privacy concerns and perceived security are key issues related to SNS (Donath, 2007; Mutambik et al., 2021). Hackers aim to gain unauthorized access to SNS or accounts to retrieve private information. By watching the SNS user type in a password, anyone can gain access to private and confidential information (Shin, 2010). SNS providers may make private SNS information available to third parties (i.e., e-vendors, e-marketers, friends, and other users) through application programming interfaces, which third parties can then control (Dwyer et al., 2007). SNS user privacy is at substantial risk when publicly available data can be tracked. User activities can be linked to this data to mine and extract sensitive information (Ali et al., 2018). The challenge for SNS designers is to simultaneously ensure personal security and promote information sharing and sociability (Brandtzaeg et al., 2010).

Few studies have evaluated the influence of privacy concerns and perceived security on addictive behavior in SNS. This is the first study to analyze how privacy concerns and perceived security moderate the relationships between stickiness and addiction for SNS users.

The researchers applied economic, sociological, and cognitive psychology to develop a model to explain addiction to SNS. The proposed model is based on the social capital theory. The roles of social capital, privacy concerns, and perceived security in user addiction to SNS have not been

examined. This study conceptualized and examined a research model of the social capital theory, including privacy concerns and perceived security, to explore addictive behaviors on SNS. In addition, this is the first study to propose that stickiness mediates the relationships between social capital and addiction. Thus, this research contributes to the literature related to social networks.

First, predictors of addiction have not received much attention. In addition, the literature lacks comprehensive models of addictive behaviors. Second, the research model provides a theoretical foundation for identifying a key mediator (stickiness) between social capital and addiction. This study examined these relationships empirically in the context of SNS. Third, the researchers proposed key moderators, privacy concerns, and perceived security. Finally, the study considered how this research model can be used to propose novel predictors of addiction and discussed theoretical and practical implications.

LITERATURE REVIEW

SNS

SNS are web-based communities that enable individuals to connect with others over the Internet to share or exchange information (Boyd & Ellison, 2007). SNS play a key role in providing information to users (Akter, 2014; Pappas et al., 2020). Individuals use SNS to improve social relationships, communicate, produce meaning, and exchange information (Akter, 2014; Yen, 2016). The most basic SNS enable users to build online profiles and interact with others. To join an SNS, people must sign up as members. This process may include providing personal information like a name and e-mail. Members engaged in social networking activities create public or semipublic profiles that include data like their gender, date of birth, religion, hometown, political views, and a self-introduction. Moreover, SNS enable users to create personal or shared lists, defining social networks by joining groups, adding friends, and viewing lists (Boyd & Ellison, 2007). Members can search for profiles on their network, share information, send and receive messages, and display what other members can see in their profiles (Dwyer et al., 2007).

Social Capital Theory

The social capital theory, which emphasizes the importance of strong interpersonal networks that develop over time, first appeared in sociology (Sherif et al., 2006). This theory provides a useful theoretical basis for understanding information technology and information systems (Chen, 2013; Chen et al., 2015; Karahanna & Preston, 2013; Wagner et al., 2014).

Social capital refers to the resources people can access from their social connections and networks (Dickinson et al., 2017; Sigerson & Cheng, 2018). The literature has shown that social capital influences community issues like crowdfunding and social media (Medina-Molina et al., 2019; Weiler et al., 2022; Zhang et al., 2022). Therefore, social capital is dependent on the relationships between people and their connections to the community (Okoli & Oh, 2007; Wang et al., 2018).

Social capital comprises structural, relational, and cognitive features (Nahapiet & Ghoshal, 1998). The structural dimension refers to the formation of information networks (Chen et al., 2016). The relational dimension concerns the nature of connections between people in an organization. The key aspects of this dimension are trust, identification, and norms (Chang & Chuang, 2011). The cognitive dimension is the degree to which people in a social network share opinions (Chang & Chuang, 2011; Li et al., 2013; Wang et al., 2016). Many studies have explored the impact of social capital on knowledge sharing in online communities. Yan et al. (2019) found that structural capital and cognitive capital affect the quality and quantity of knowledge contribution in online user communities. Zhou (2020) reported that relationship capital and cognitive capital positively affect the acquisition of social network knowledge in online health communities. Wang et al. (2022) stated that social capital is a vital variable that mediates the relationship between knowledge search and

knowledge contribution in online Q&A communities. The key resources for this dimension are the existence of a shared language and goals.

This study explored the possibilities that SNS hold for building social capital among users. The researchers used social network ties as the variable for structural social capital. They used trust in SNS, trust in members of SNS, social identification, and social norms as the variables for relational social capital. Finally, they used shared language and shared goals as the variables for cognitive social capital.

Addiction

Addiction refers to the compulsion to repeat behaviors regardless of the consequences (Cui et al., 2018). It is considered an unhealthy and compulsive preoccupation with trivial or repetitive behaviors, with irrational motives for such behaviors (Chou & Ting, 2003; Heather, 2017). Addiction has been discussed by social psychologists and pharmacologists (Adalier & Balkan, 2012; Gerlach & Cenfetelli, 2020; Hunter et al., 2017; Venkatesh et al., 2019). Griffiths (1996) argued that addiction comprises six components: (1) tolerance; (2) relapse; (3) conflict; (4) salience; (5) mood modification; and (6) withdrawal symptoms. LaRose et al. (2003) noted that the general symptoms of Internet addiction include tolerance, preoccupation, relapse, withdrawal, adverse life consequences, loss of control, escapism, and concealment.

SNS addiction refers to the compulsive use of SNS and strong psychological dependency on SNS (Moqbel & Kock, 2017; Xu & Tan, 2012). People with SNS addiction have strong cravings to use SNS repeatedly. They experience withdrawal symptoms when they stop using SNS (Xu et al., 2012). Studies have also explored SNS addiction from different perspectives. Tarafdar et al. (2019) found a possible relationship between social network-related stress and SNS addiction. Gong et al. (2019) indicated that SNS-related addictive behavior depends on an individual's perceived benefits, especially social and hedonic benefits. Miranda et al. (2023) examined the mediators of the influence of SNS usage motivation on the development of addiction in SNS users. Furthermore, Seo and Ray (2019) explored the negative impact of SNS addiction on the use and outcomes of goal congruence.

Privacy Concerns and Perceived Security in SNS

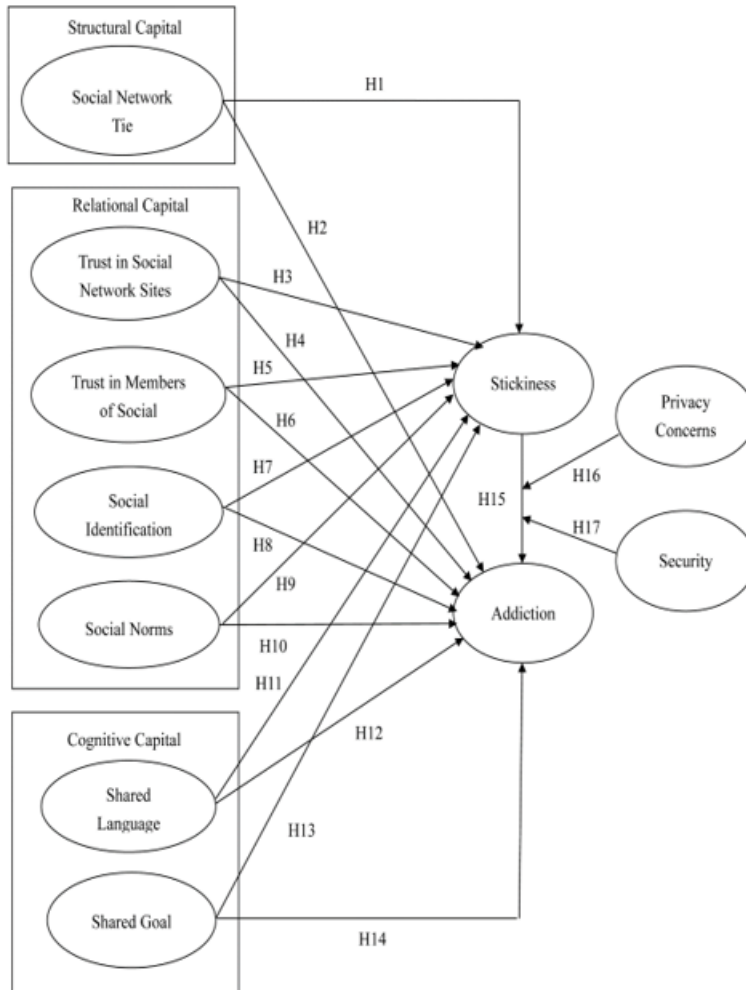
Privacy concerns and perceived security are based on user perceptions (Benamati et al., 2021; Gupta & Dhama, 2015). Privacy concerns refer to a user's concerns about the possible loss of privacy due to voluntary or surreptitious information disclosure on SNS (Dinev & Hart, 2006). Perceived security refers to the degree to which users perceive that using SNS is free of risk (Shin, 2010). However, SNS involve privacy and security risks through various exposures (Ali et al., 2018; Van Eecke & Truysens, 2010).

Frequent users often attract the attention of attackers. SNS users face privacy and security threats because of the high number of SNS users; therefore, privacy concerns and security issues are critical in social media (Ali et al., 2018). However, privacy, security, and access controls are weak by design in most SNS (Shin, 2010). For example, privacy and security risks in SNS involve social phishing. Phishers use SNS to mine information about relationships and shared interests within communities (Shin, 2010). Thus, protecting user privacy and security has become a key concern for SNS marketers (Hajli & Lin, 2016; Henson et al., 2011).

RESEARCH MODEL AND HYPOTHESES

Figure 1 illustrates the theoretical research model based on the social capital theory. This study examined the influence of interpersonal relationships through the structural dimension (social network ties), relational dimension (trust in social network sites, trust in members of social network sites, social identification, and social norms), and cognitive dimension (shared language and shared goals). These serve as antecedents and are assumed to have a positive direct and indirect influence on the

Figure 1. Research



dependent variables (stickiness and addiction) in online social networking. The study also explored how privacy concerns and security moderate the relationship between stickiness and addiction.

Structural Capital

Social network ties are a key element of the structural dimension of social capital, which is the foundation of information networks. Social network ties are the impersonal configuration of connections between humans (Felder, 2020). These social ties serve as channels for the flow of information and resources (Liu et al., 2016; Tsai & Ghoshal, 1998). Social network ties are created as SNS users communicate. Users who are central to the network and are connected to a large number of other SNS users are more likely to continue to contribute to collective activities. These efforts are key to sustaining and maintaining digital social communications and interactions. Social network ties provide information channels that increase user stickiness and addiction to the SNS.

H1: Social network ties are positively associated with stickiness.

H2: Social network ties are positively associated with addiction.

Relational Capital

Trust is a fundamental relationship building and maintenance mechanism (Gefen et al., 2003). Trust is also a confidence in the behavior of another party, existing when a party believes that another party is trustworthy (McAllister, 1995; Wang et al., 2014). Perceived lack of trust and confidence in the other party reduces an individual's motivation to maintain relationships (Li et al., 2006). Trust influences perceptions, attitudes, and intention to engage in behaviors dependent on others (Gefen et al., 2008; Lim et al., 2006; Oliveira et al., 2017; Teo et al., 2008).

SNS users have trust in both SNS and their members (Sohaib, 2021). Numerous people on SNS have profiles that reveal private information. The reputation of SNS has diminished because of privacy incidents publicized by media (Dwyer et al., 2007). As users develop trust in SNS, they tend to use it more often. In addition, trust increases with and affects the popularity of SNS. Therefore, this study hypothesized that stickiness and addiction are the results of trust in SNS and their users.

H3: Trust in SNS is positively associated with stickiness.

H4: Trust in SNS is positively associated with addiction.

H5: Trust in the members of SNS is positively associated with stickiness.

H6: Trust in the members of SNSs is positively associated with addiction.

Social identification, the ability to self-identify as part of a larger group (Postmes et al., 2019), plays a critical role in determining online community participation (Bagozzi & Dholakia, 2002; Farivar et al., 2018). Individuals are incentivized to engage in behaviors required to maintain relationships with online community members. A key to maintaining these relationships is actively participating in online communication and interactions (Dholakia et al., 2004). Social identification refers to a user's sense of belonging to a SNS. When users have a strong sense of identity with the SNS, they are more likely to participate in the SNS. Identification requires positive, self-defining relationships with other SNS users; therefore, individuals are motivated to engage in these behaviors (Hogg & Abrams, 1988). Social identification prompts group-oriented online social networking behavior. SNS stickiness and addiction are influenced by social identification. Social identification reflects users' efforts to present and express themselves to others, enhancing intention to use SNS.

H7: Social identification is positively associated with stickiness.

H8: Social identification is positively associated with addiction.

Social influence profoundly affects individuals' perceptions and behavior (Lu & Wang, 2008). Social factors positively influence Internet technology use (Lucas & Spitler, 2000; Venkatesh & Morris, 2000; Wang & Chou, 2016; Yang, 2021; Zhou, 2019). The theory of reasoned action provides a theoretical basis for exploring a hypothetical relationship between social norms and individual behavior (Fishbein & Ajzen, 1975). Some empirical studies have suggested that social influence positively affects behavior (Beldad & Hegner, 2018; Cheung et al., 2000; Hu et al., 2019; Karahanna & Straub, 1999; Liu et al., 2020; Vahdat et al., 2021). This study proposed that social norms affect stickiness and addiction to SNS.

H9: Social norms are positively associated with stickiness.

H10: Social norms are positively associated with addiction.

Cognitive Capital

Social capital involves a shared understanding and language. A shared language is "the acronyms, subtleties, and underlying assumptions that are the staples of day-to-day interactions" (Lesser &

Storck 2001, p. 836). A shared language can be used to convey knowledge essential to information flow in an SNS (Wang et al., 2016). SNS users utilize their shared understanding to build their vocabulary, thereby increasing the efficiency of communication. Thus, a shared language motivates users to remain involved in social networking activities. Shared languages may increase stickiness and addiction to SNSs. Therefore:

H11: Shared languages are positively associated with stickiness.

H12: Shared languages are positively associated with addiction.

Shared goals are the collective aspirations of organization members (Miller et al., 2007; Tsai & Ghoshal, 1998). Shared goals enhance communication and minimize misunderstanding (Chow & Chan, 2008; Tsai & Ghoshal, 1998). Group members with clear shared goals have a greater sense of community and team orientation; therefore, they are more willing to interact with other members (Bautista & Bayang, 2015; Burroughs & Eby, 1998). Shared goals facilitate the exchange of ideas and mutual understanding.

H13: Shared goals are positively associated with stickiness.

H14: Shared goals are positively associated with addiction.

Stickiness

Stickiness is the frequency, depth, and duration of site visits (El-Manstrly et al., 2020). Website stickiness is associated with attraction, conversion, and retention (Agrawal et al., 2001). Stickiness positively affects users' intention to use WeChat (Lien et al., 2017). Hsu and Lin (2016) observed that stickiness positively affects consumers' willingness to purchase mobile applications. Ramayah et al. (2015) reported that blog stickiness strongly affects retention. In addition, stickiness positively and significantly influences website loyalty (Roy et al., 2014). Therefore:

H15: Stickiness is positively associated with addiction.

Privacy Concerns and Perceived Security

Privacy concerns and perceived security, a key part of the online experience, play a crucial role in the digital world (Barth & Jong, 2017; Bellman et al., 2004; Fernandes & Costa, 2023). The sharing of individually generated information has increased with the emergence of SNS. These platforms are used to create and exchange private information in an effortless and seamless manner (Gritzalis et al., 2014). However, when marketers target SNS users, unexpected consequences could affect perceived privacy and security (Aker & Wamba, 2016). The growing popularity of SNS raise questions surrounding perceived privacy and security for users. Despite their increasing importance, privacy concerns and security issues have not been studied as moderators of SNS addiction. Privacy concerns and perceived security are individual factors that may significantly moderate users' acceptance and use of technology (Chatterjee et al., 2017; Featherman & Fuller, 2003; Im et al., 2008; Tan et al., 2012). The effect of stickiness on addiction may be affected by privacy concerns and perceived security on SNS. The effect of stickiness on addiction may be stronger for SNS with fewer privacy concerns and a high degree of perceived security. This study assessed whether privacy concerns and security perceptions moderate stickiness and addiction. Therefore:

H16: Stronger privacy concerns weaken the relationship between stickiness and addiction.

H17: Weaker perceptions of security weaken the relationship between stickiness and addiction.

RESEARCH METHODOLOGY

Measurements

This study's measurement instrument was based on other studies. The survey's pretest was conducted by two researchers to increase the face validity of the questionnaire. A total of 54 SNS users joined the pilot study before the survey was fully launched in the target population. The results of the pilot study indicated that the Cronbach's α value for each construct exceeded the criterion of 0.735, which is acceptable (Nunnally, 1978). The measurement instrument involved a seven-point Likert-type scale, with 1 representing total disagreement and 7 representing total agreement. The scales that measure social network ties were adapted from Tsai and Ghoshal (1998). The scale items for trust in SNS and trust in the members of SNS were adapted from Dwyer (2007). The scales for social identification were adapted from Bagozzi and Dholakia (2002) and Nahapiet and Ghoshal (1998). The scales measuring social norms were adapted from Fishbein and Ajzen (1975). Items for shared language and shared goals were adapted from Nahapiet and Ghoshal (1998) and Tsai and Ghoshal (1998). Items for stickiness were adapted from Lin (2007) and Li et al. (2006). The scales for addiction were adapted from Xu et al. (2012) and Chou and Ting (2003). The scales for privacy concerns were adapted from Buchanan et al. (2007) and Metzger (2004). The scales for perceived security were adapted from Yenisey et al. (2005).

Data Collection

To gather empirical data, this study conducted field surveys of SNS users by creating accounts on popular SNS and posting invitations to participate in public forums and groups. A total of 242 questionnaires were collected. After removing duplicates, invalid submissions, and those with missing values, 227 valid questionnaires were included in the analysis. The demographics of the participants are presented in Table 1, with 46.7% male and 53.3% female. In terms of age, 24.7% were younger

Table 1. Demographics of respondents

| Demographics | Category | Frequency | Percentage |
|----------------------------|-----------|-----------|------------|
| Gender | Male | 106 | 46.7 |
| | Female | 121 | 53.3 |
| Age | < 20 | 56 | 24.7 |
| | 21-29 | 103 | 45.4 |
| | 30-39 | 47 | 20.7 |
| | > 40 | 21 | 9.2 |
| Internet Experience (Year) | < 1 | 15 | 6.6 |
| | 1~3 years | 27 | 11.9 |
| | 3~5 years | 36 | 15.9 |
| | 5~7 years | 48 | 21.1 |
| | > 7 years | 101 | 44.5 |
| SNS Experience (Year) | < 1 | 27 | 11.9 |
| | 1~3 years | 36 | 15.9 |
| | 3~5 years | 88 | 38.8 |
| | 5~7 years | 45 | 19.8 |
| | > 7 years | 31 | 13.6 |

than 18 years, 66.1% were between 20 and 40 years, and 9.2% were older than 40 years. Furthermore, most respondents (65.6%) had five or more years of general internet experience, with 27.8% having less than three years of SNS experience, 72.2% having more than three years of experience, and 38.8% having between three and five years of experience.

DATA ANALYSIS AND RESULTS

Measurement Model

To avoid the impact of common method bias (CMB), this study adopted Harman’s single-factor analysis (Harman, 1967). The cumulative variance of the first factor tested was 47.639%, which was less than the recommended cutoff of 50% (Podsakoff et al., 2012). This finding suggests that CMB was not a concern in this study.

The Kaiser-Meyer-Olkin (KMO) test and Bartlett’s test were conducted to assess the suitability of factor analysis. A KMO value > 0.5 indicates adequate sample size. The ideal value is > 0.8 (Kaiser, 1974). The KMO values obtained in this study (see Table 2) indicated that the sampling adequacy was excellent (KMO = 0.909). The results of Bartlett’s test of sphericity were significant, indicating that the measurement approach was valid. All the constructs were assessed for potential multicollinearity by using variance inflation factors (VIF). The VIF values of all constructs were below 10 (between 1.854 and 3.698), indicating that multicollinearity was not a problem (Hair, 2019).

The study used partial least squares (PLS) structural equation modeling to analyze the hypotheses. A confirmatory factor analysis was conducted to examine the measurement model with all constructs. The reliability of the items, internal consistency between items, and convergent and discriminant validity of the model were used to assess the acceptability of the measurement model. Table 3 presents the number of items, means, standard deviations, composite reliability, average variance extracted (AVE), square root of the AVE, and correlations between the constructs. The composite reliability for all constructs was greater than 0.84, which is above the suggested value of 0.70. This indicates acceptable internal consistency (Hair et al., 2020). The AVE values of all the constructs were above 0.50, indicating convergent validity (Hair et al., 2019). The square roots of the AVE values of each construct were greater than the corresponding correlation coefficients, indicating discriminant validity (Hair et al., 2019).

Structural Model Assessment and Hypotheses Testing

The standardized PLS path coefficients used to examine the structural model are presented in Figure 2. These results support all the hypotheses (H1–15). The paths from social network ties to stickiness and addiction were statistically significant. Therefore, H1 and H2 are supported. Trust in SNS significantly affected stickiness and addiction. Therefore, H3 and H4 are supported. Trust in members of SNS significantly affected stickiness and addiction. Therefore, H5 and H6 are supported. The paths from social identification to stickiness and addiction were statistically significant. Therefore, H7 and H8 are supported. The paths from social norms to stickiness and addiction were statistically significant. Therefore, H9 and H10 are supported. The existence of a shared language was positively related to stickiness and addiction. Therefore, H11 and H12 are supported. Shared goals were

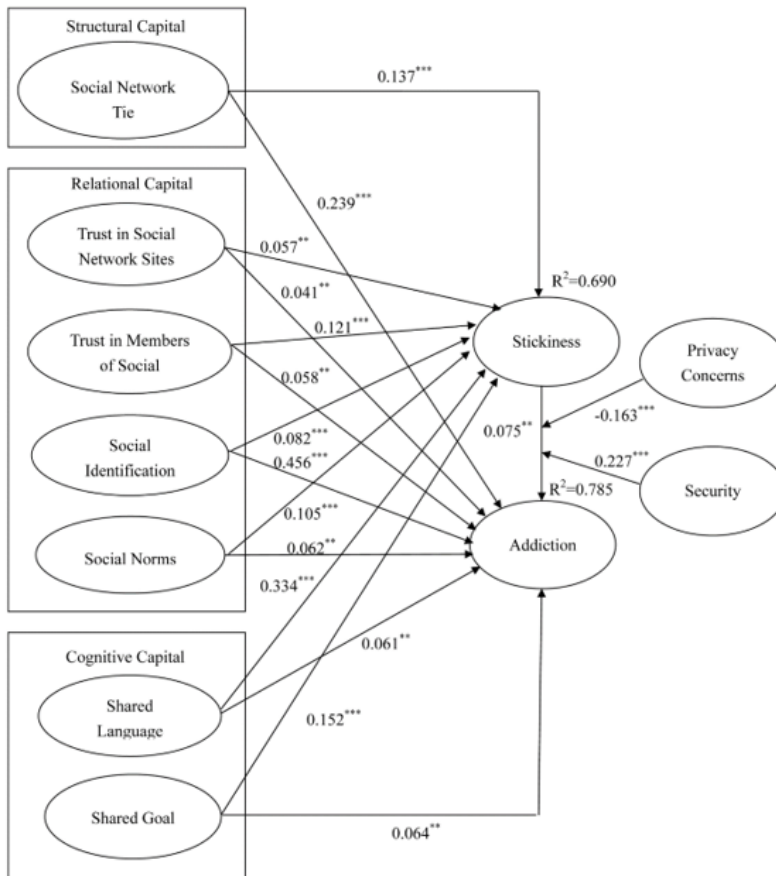
Table 2. KMO test and Bartlett’s test

| | | |
|----------------------------------|--------------------|----------|
| KMO Measure of Sampling Adequacy | | 0.909 |
| Bartlett’s Test of Sphericity | Approx. Chi-Square | 1788.202 |
| | Df | 55 |
| | Sig. | .000 |

Table 3. Descriptive statistics and correlations

| No. | Construct | No. of Items | Mean (SD) | Composite Reliability | AVE | Correlations | | | | | | | | | | | | |
|-----|--|--------------|------------|-----------------------|------|--------------|-------|------|------|------|------|------|------|------|------|------|--|--|
| | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | | |
| 1 | Social Network Tie | 4 | 4.81(1.36) | 0.95 | 0.82 | 0.91 | | | | | | | | | | | | |
| 2 | Trust in Social Network Sites | 2 | 4.65(1.37) | 0.92 | 0.85 | 0.40 | 0.92 | | | | | | | | | | | |
| 3 | Trust in Members of Social Network Sites | 2 | 4.75(1.24) | 0.85 | 0.74 | 0.63 | 0.58 | 0.86 | | | | | | | | | | |
| 4 | Social Identification | 4 | 4.48(1.20) | 0.93 | 0.78 | 0.73 | 0.34 | 0.57 | 0.88 | | | | | | | | | |
| 5 | Social Norms | 3 | 4.86(1.42) | 0.97 | 0.92 | 0.71 | 0.45 | 0.53 | 0.62 | 0.96 | | | | | | | | |
| 6 | Shared Language | 3 | 4.89(1.37) | 0.94 | 0.84 | 0.74 | 0.46 | 0.60 | 0.62 | 0.75 | 0.92 | | | | | | | |
| 7 | Shared Goal | 3 | 4.87(1.17) | 0.93 | 0.82 | 0.73 | 0.41 | 0.53 | 0.68 | 0.66 | 0.69 | 0.91 | | | | | | |
| 8 | Stickiness | 4 | 4.95(1.33) | 0.91 | 0.72 | 0.73 | 0.47 | 0.62 | 0.65 | 0.69 | 0.77 | 0.69 | 0.85 | | | | | |
| 9 | Addiction | 11 | 4.34(1.26) | 0.96 | 0.71 | 0.79 | 0.42 | 0.62 | 0.82 | 0.67 | 0.69 | 0.71 | 0.72 | 0.84 | | | | |
| 10 | Privacy Concerns | 4 | 4.10(1.17) | 0.84 | 0.57 | 0.19 | -0.12 | 0.11 | 0.36 | 0.14 | 0.15 | 0.31 | 0.21 | 0.29 | 0.75 | | | |
| 11 | Security | 3 | 3.47(1.29) | 0.88 | 0.72 | 0.14 | -0.26 | 0.01 | 0.26 | 0.11 | 0.04 | 0.20 | 0.10 | 0.18 | 0.63 | 0.85 | | |

Figure 2. Results of PLS analysis



positively correlated with stickiness and addiction. Therefore, H13 and H14 are supported. Stickiness significantly influenced addiction, supporting H15. The results suggest that privacy concerns negatively moderate the relationship between stickiness and addiction. However, perceived security positively moderates the relationship between stickiness and addiction. Therefore, H16 and H17 are supported. The explained variance was 69.0% for stickiness. The constructs explained 78.5% of the variance of addiction. The variance indicates that the research model had sufficient explanatory power for stickiness and addiction.

DISCUSSION AND IMPLICATIONS

Social network ties were a significant predictor of stickiness and addiction to SNS. SNS users value social ties and social connectivity networks. Social norms, shared languages, and shared goals also significantly affect user stickiness and addiction to SNS. SNS users often use shared languages in discussions with friends, classmates, and colleagues. Therefore, social influence from friends, classmates, and colleagues is a critical factor affecting SNS users' behavior. An individual is more likely to use SNS if they believe that most of their friends, classmates, and colleagues use SNS. Frequent SNS use encourages participation from new users. Stickiness to SNS represents a new social phenomenon that depends largely on communication and interactions with others.

SNS providers can hold face-to-face meetings and provide rewards (e.g., virtual currencies and experience points) to encourage users to share their experiences and enhance their social network ties. SNS providers can provide interactive features to enhance online communication and interaction among members. In addition, they can implement attractive online activities to increase interactivity.

Social identification significantly affects stickiness and addiction to SNS. A sense of group membership increases motivation to continue using SNS. The desire to belong is analogous to the desire to gain recognition from other members. When SNS members have a strong sense of belonging to a group and desire to maintain close ties with the members, they are willing to spend time using SNS.

Membership can also increase willingness to contribute. SNS usually attract a large group of members because they are a conduit for information sharing and socialization. SNS can provide members with opportunities to meet others with common goals and interests. SNS members build relationships through constant communication and have positive experiences. Members are drawn to SNS by a strong sense of belonging.

Online relationships can develop in SNS due to low levels of perceived trust and few privacy protections. SNS users who felt stronger trust had a stronger intention to share their personal information. This study divided trust into trust in SNS and trust in members of SNS. It determined that the effect of trust in members of SNS on stickiness and addiction to SNS is stronger than that of trust in SNS. SNS providers can foster trust among members by enhancing social communication and interaction and encouraging users to share personal information on SNS.

Shared languages and goals are stronger predictors of stickiness than trust. Studies have noted that trust is crucial to any business transaction. However, the study's results indicate that the path coefficient from shared language and shared goals to stickiness and addiction is higher than that of the path from trust to stickiness and addiction. This indicates that SNS users value a sense of community (of which shared languages and goals are key elements) more than bilateral relationships like trust.

These findings elucidate several key points associated with critical determinants of users' addiction to SNS that have not been addressed in other studies. Stickiness was identified as a factor that can be used to predict SNS addiction. When a user develops an addiction to SNS, SNS use becomes more compulsive than volitional. From a business standpoint, the line between stickiness and addiction is crucial. If time spent on SNS is long, stickiness is stronger and leads to addiction. Therefore, SNS

should encourage users to revisit for long periods. This study proposed that SNS addiction is a critical factor that directly contributes to stickiness. The causal relationship between stickiness and addiction is vital to both SNS users and providers. Addiction is the ultimate form of loyalty; therefore, SNS providers must master the process of creating stickiness to create loyal SNS users.

In sum, this is one of the first studies to evaluate the moderating effect of privacy concerns and perceived security in the context of SNS. Results reveal that privacy concerns significantly and negatively moderate the effects of stickiness on addiction. The moderating effect of perceived security in the relationship between stickiness on addiction is significantly positive. The findings provide SNS providers with information regarding how privacy concerns and perceived security affect stickiness and addiction, helping to design security controls to assuage privacy concerns.

SNS generally prioritize traffic over privacy and security. In addition, SNS cannot monitor content in most parts of the world. Controlling speech from international users is difficult, which has resulted in a loss of users. SNS providers should, thus, prioritize privacy and security to attract users. They can also inform users that they value and consider their security and privacy (Shin, 2010). SNS users should avoid unnecessarily sharing private data on SNS, install antivirus and antispyware software on their devices, and uninstall unnecessary third-party applications to protect their login credentials (Ali et al., 2018).

In addition, SNS must enable users worldwide to be online at the same time to create a sense of immersion. SNS providers can provide augmented reality glasses to enable users to stay in the real world, provide virtual reality glasses to fully immerse users in SNSs, and provide mixed reality glasses to combine real and virtual worlds as it creates a new environment and enhances user experience.

Overall, the findings provide empirical evidence for SNS marketers, SNS operators, SNS developers, and other parties to manage their businesses and formulate privacy and security policies and regulations.

With the widespread use of SNS, the problem of SNS addiction has started to receive attention. Theoretically, this study has contributed to the subject of SNS addiction in several aspects. First, although many studies have explored the antecedents of SNS addiction according to different theories or perspectives (Gong et al., 2019; Miranda et al., 2023; Seo & Ray, 2019; Tarafdar et al., 2019), no study (until now) has explored the antecedents of SNS addiction from the perspective of social capital. Therefore, the researchers conceptualized a research model of the antecedents of SNS addiction based on social capital theory. Second, in addition to exploring the antecedent causes of SNS addiction through the social capital theory, this study analyzed the mediating effect (stickiness) and moderating effect (security and privacy concern) on the association between social capital and SNS addiction. Studies have focused on the direct impact of security and privacy considerations on SNS user behavior (Chen et al., 2021). The application of moderating variables in this study can enhance understanding of the influence of social capital on SNS addiction.

This study has several limitations that should be addressed in future research. First, this study did not explore the consequences of addiction. Second, studies should identify additional antecedents of addiction in other fields. Third, for researchers examining addiction, additional topics remain to be investigated. Finally, analysis of longitudinal data and interviews may be conducted to obtain more reliable results.

CONCLUSION

By using the social capital theory, this study explored the influence of structural capital, relational capital, and cognitive capital on stickiness. These factors, in turn, affect addiction. This study revealed that constructs like social network ties, trust in SNS, trust in members of SNS, social identification, social norms, shared language, and shared goals affect both stickiness and addiction. Furthermore,

this study found that privacy concerns and perceived security were key moderators of the relationship between stickiness and addiction. These findings can be used as a reference by stakeholders in the SNS ecosystem.

COMPETING INTERESTS

The authors of this publication declare there are no competing interests.

FUNDING AGENCY

This research received no specific grant from any funding body in the public, commercial, or not for-profit sectors.

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APPENDIX

Measurement Items

Social Network Ties (SNT)

- (SNT 1) I maintain close social relationships with some members of SNS.
- (SNT 2) I spend a lot of time interacting with some members of SNS.
- (SNT 3) I know some members of SNS on a personal level.
- (SNT 4) I have frequent communication with some members of SNS.

Trust in Social Network Sites (TS)

- (TS1) I feel that the privacy of my personal information is protected by SNS.
- (TS2) I trust that SNS will not use my personal information for any other purpose.

Trust in Members of Social Network Sites (TM)

- (TM1) I believe that most of the profiles I view on SNS are exaggerated to make the person look more appealing.
- (TM2) I worry that I will be embarrassed by wrong information others post about me on SNS.

Social Identification (SI)

- (SI1) I feel a sense of belonging toward SNS.
- (SI2) I experience a feeling of togetherness or closeness on SNS.
- (SI3) I have a strong positive feeling toward SNS.
- (SI4) I am proud to be a member of SNS.

Social Norms (SN)

- (SN1) My colleagues think that I should use SNS.
- (SN2) My classmates think that I should use SNS.
- (SN3) My friends think that I should use SNS.

Shared Language (SL)

- (SL1) The members on the SNS use common terms or jargon.
- (SL2) The members on the SNS use understandable communication patterns during discussions.
- (SL3) The members on the SNS use understandable narrative forms to post messages or articles.

Shared Goals (SG)

- (SG1) The members on the SNS aim to share social life information.
- (SG2) The members on the SNS share the goal of making friends.
- (SG3) The members on the SNS share the vision that making friends is pleasant.

Stickiness (STI)

(STI1) I would use this SNS for a longer time than another SNS.

(STI2) I intend to prolong my use of this SNS.

(STI3) I would visit this SNS as often as I can.

(STI4) I intend to connect to this SNS every time I am online.

Addiction (AD)

(AD1) I felt depressed whenever I needed to stop using this SNS.

(AD2) When using this SNS, I tend to stay online longer than intended.

(AD3) Sometimes I lie to family members or friends to conceal how often and how long I use this SNS.

(AD4) I need to spend increasing amounts of time on this SNS to achieve satisfaction.

(AD5) I keep reconnecting to SNS even after spending too much time on it.

(AD6) I have made several unsuccessful efforts to control, cut back, or stop using SNS.

(AD7) Using SNS is the most meaningful activity in my life.

(AD8) I feel preoccupied with using SNS.

(AD9) I have been deeply involved in using SNS.

(AD10) I use SNS to escape my problems or relieve feelings of helplessness, guilt, anxiety, or depression.

(AD11) I have jeopardized or risked the loss of significant relationships, my job, and educational or career opportunities because of my SNS use behavior.

Privacy Concerns (PC)

(PC1) I am concerned that I do not know the parties who collect the information I provide on SNS.

(PC2) I am aware of the exact nature of information that will be collected during the use of SNS.

(PC3) I am concerned that the information I submitted on the SNS could be misused.

(PC4) I am concerned that there is no effective mechanism to address any violation of the information I provide to the SNS.

Security (SEC)

(SEC1) I believe the information I provide to the SNS will not be manipulated by inappropriate parties.

(SEC2) I am confident that the private information I provide to the SNS will be secure.

(SEC3) I believe inappropriate parties may deliberately view the information I provide to this SNS.

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