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Multi-homing on SNSs: The role of optimum stimulation level and perceived complementarity in need gratification

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ABSTRACT

Given the increasingly intense competition for social networking sites (SNSs), ensuring sustainable growth in user base has emerged as a critical issue for SNS operators. Contrary to the common belief that SNS users are committed to using one SNS, anecdotal evidence suggests that most users use multiple SNSs simultaneously. This study attempts to understand this phenomenon of users' multi-homing on SNSs. Building upon optimum stimulation level (OSL) theory, uses and gratifications theory, and literature on choice complementarity, a theoretical model for investigating SNS users' multi-homing intention is proposed. An analysis of survey data collected from 383 SNS users shows that OSL positively affects users' perceived complementarity between different SNSs in gratifying their four facets of needs, namely, interpersonal communication, self-presentation, information, and entertainment. Among the four dimensions of perceived complementarity, only interpersonal communication and information aspects significantly affect users' intention to multi-home on SNSs. The results from this study offer theoretical and practical implications for understanding and managing users' multi-homing use of SNSs.

1. Introduction

Social networking sites (SNSs) have become increasingly pervasive in recent years. Globally, more than 1.8 billion people have participated in SNSs as of 2014, and this number is expected to reach 2.3 billion by 2017 [35]. It has been reported that users spent an average of 28% of their Internet time on SNSs in 2014 [42]. The social networks constructed on digital platforms have penetrated and significantly changed various aspects of individual and organizational life [1]. Users can satisfy multiple facets of their needs on these platforms. By using SNSs, users share and communicate with friends, seek information about events and celebrities, express thoughts and opinions, learn about products and services, and play games, among other activities [13,34,118].

Since the first SNS SixDegrees.com was launched in 1997, hundreds of SNSs with various technological affordances have emerged to support a wide range of interests and practices [13]. It is noteworthy that we do not see a single dominant SNS in most countries. Rather, at least two prominent SNSs are coexisting. In China, the world's largest Internet market with 649 million users [24], the two major domestic SNSs are Renren (literally means everyone) and Tencent Qzone [23]. In the United States, Google+ is replacing MySpace as a direct competitor to Facebook in the SNS market [40]. Similar situations exist in many other countries and regions, such as Naver and Cyworld in South Korea, Mixi and Facebook in Japan, V Kontakte and Facebook in East Europe, and Hyves and Facebook in the Netherlands.

Interestingly, instead of pledging loyalty to one SNS, a considerable proportion of users adopt several SNSs simultaneously, that is, users are multi-homing on SNSs. A survey conducted by iResearch showed that 81.2% of Chinese bulletin board system users use more than two SNSs, among whom half use two SNSs and one-third use three SNSs [56]. A survey by China Internet Network Information Center (CNNIC) also revealed that most SNS users in China show multi-homing behavior, using an average of 2.78 sites simultaneously [22]. Similarly, in the United States, most Americans do not use just one SNS but instead embrace several SNSs [38]. This usage pattern has led to the proliferation of Internet tools, such as GrabInBox, which help manage multiple SNS accounts.

Different from the use of a single SNS, multi-homing use explicitly entails users' making choices among multiple SNSs.

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As the competition between different SNSs becomes increasingly intense, understanding the factors that affect users' multi-homing decision has important implications for the development of competitive strategies of SNS operators. However, the multi-homing use of SNSs has received scant attention from academic researchers. Moreover, extant studies on SNS use have focused mostly on the underlying reasons for users' adoption, usage, and (dis)continued use of a particular SNS, and have largely neglected the intriguing questions on the underlying drivers of concurrent use of multiple SNSs. Although a few studies (e.g., [47,117]) have noted users' multi-homing use of SNSs, the research focus has been elsewhere. For instance, Turel and Serenko [117] have suggested users' simultaneous use of multiple SNSs (at least 46% of the respondents use both Facebook and MySpace), but they investigated the two-sided effects of users' perceived enjoyment on usage outcomes. Thus, this study attempts to address a gap in literature by developing a model that explains *what motivates users to multi-home on SNSs* and *what type of users are more prone to explore and multi-home*.

Drawing upon optimum stimulation level (OSL) theory, uses and gratifications theory (UGT), and literature on choice complementarity, this study develops a theoretical model of users' intention to multi-home on SNSs. This study theorizes that users' perceived complementarity between SNSs[3] on gratifying four facets of their needs, namely, interpersonal communication, self-presentation, information, and entertainment, constitutes a main driver of users' multi-homing intention. Users' personality trait, that is, OSL as a distal influence on multi-homing intention, has a positive effect on users' perceived complementarity regarding the gratification of the four needs.

This research contributes theoretically by investigating users' multi-homing intention in an SNS context. It adds to the information systems (IS) adoption and use literature and enriches our understanding of the factors affecting a user's decision to adopt multiple SNSs. Practically, this study should be of considerable interest to SNS operators who desire to achieve sustained growth in user base and website traffic. The results of this study can offer guidance to SNS managers in formulating appropriate user-centric strategies and provide empirical evidence to SNS operators in identifying user segments and adapting marketing activities to compete in this intensely competitive market.

The remainder of this paper proceeds as follows. Section 2 describes the relevant theories and how they lead to the theoretical model of users' multi-homing intention on SNSs. Section 3 presents the research model and develops the hypotheses. Section 4 discusses the methodology and reports the results of our empirical analysis. Section 5 provides a discussion of the findings, the theoretical and practical implications, and limitations of this study. Finally, Section 6 concludes.

2. Theoretical background

2.1. Uses and gratifications theory

UGT is a media use paradigm originating from mass communication research and guides the assessment of users' motivations for media usage and access [109]. This theory is grounded primarily on five basic assumptions [2,59,74]. First, audiences are not passive recipients of media content. Instead, they are active gratification seekers in the interaction with media. Second, audiences are goal-directed. They select and utilize a particular medium or content to fulfill a particular set of socio-psychological needs. Third, audiences are sufficiently self-aware to recognize and articulate the reasons for their choice and consumption of a medium. Fourth, different medium outlets have distinct capabilities to satisfy audience needs. Multiple media compete for audience selection, attention, and use. Lastly, the degree in which audience needs can be properly satisfied by the consumption of a medium varies from person to person.

Unlike traditional media effect theories on powerful media and passive audiences, UGT emphasizes what people do with media rather than what media do to people [58]. According to UGT, people are motivated by their self-defined social and psychological needs to choose and consume a medium [59,62,76]. Given that media differ in their capacity to fulfill individual needs and that the same medium can be used to satisfy different individuals' distinct needs, individuals will select the appropriate media for the most satisfying gratification [62].

Audiences can derive gratification from the process of using media (e.g., being entertained by the recreational act of browsing a website), as well as from the content carried by media (e.g., gaining information from a website) [59]. On the basis of this notion, some early studies have divided audience gratifications into two types: process gratification and content gratification [29]. However, as evidenced by subsequent research (e.g., [76,108,129]), this simple dichotomous classification is limited because it cannot describe the specific diverse motives of audience media adoption. Furthermore, some gratifications cannot be simply categorized as either process or content type. For instance, Stafford, Stafford, and Schkade [109] have suggested a distinct gratification type, namely, social gratification, which reflects individuals' Internet use for interpersonal communication purpose. Thus, to obtain a comprehensive view of audience's specific motives for accessing and using a medium, researchers have generally applied the two-stage approach by first generating an item pool that describes audiences' diverse uses and gratifications and subsequently performing factor analyses on the items to identify and profile audience motives.

UGT is a powerful approach for understanding the motivations of people using mass media and the gratifications obtained from different media [76]. It has been widely applied to investigate individuals' uses and gratifications in various media contexts. For example, this theory has been applied to the contexts of traditional media, such as newspapers and televisions (e.g., [33,103]), "digital media" Internet (e.g., [109]), web-based services (e.g., [76]), and mobile services (e.g., [66]). By using the two-stage approach, these studies have identified a list of gratifications that influence different media use, such as entertainment, social interaction, escapism, time passing, information seeking, and interpersonal utility [76,129].

With the increasing popularity of SNSs in recent years, UGT has also been employed by many researchers (e.g., [99]) to analyze why individuals use SNSs and what gratifications are obtained from such media use. The tenets of UGT have an important implication for the current study. In the SNS multi-homing use context, users actively explore and evaluate SNSs and make purposive choices about which sites to use. UGT focuses on the drivers of users' media choice rather than the effects of media on users and assumes that audiences are active, goal-directed, and select the appropriate media to gratify their diverse needs. Hence, this theory is particularly suitable for explaining the motivational factors of SNS users' multi-homing decision.

[3] The scope of this paper is limited to open-to-all general SNSs, such as Facebook, Google+, RenRen, and Mixi, which cater to diverse audiences and primarily serve the purpose of creating and maintaining relationships with known or unknown offline friends and family. This research does not include non-general SNSs, such as professionally oriented (e.g., LinkedIn), dating-oriented (e.g., match.com, zhenai.com), picture-sharing (e.g., Pinterest, Flickr), and microblogging SNSs (e.g., Twitter). The main purposes of non-general SNSs are distinct; thus, the complementarity between these sites in gratifying user needs is conceivably higher than that between general SNSs. Hence, the inclusion of non-general SNSs could dilute the focus of this study.

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2.2. Complementarity in choices

The concept "complementarity" was first introduced in economics by Edgeworth, whereby activities are considered complements if doing (more of) any one of them increases the returns to doing (more of) the others [8,85]. In a broad sense, complementarity reflects the idea that having more of one factor increases the value of having more of the other complementary factor [8]. This notion of complementarity, sometimes referred to as complementarity theory [8,19,20], has been widely applied to various fields, such as marketing (e.g., [63,90]), organizational strategy (e.g., [8,19,20]), mass communication (e.g., [32]), and electronic commerce (e.g., [55,71]). These studies have consistently demonstrated the significance of complementarity effects at an individual or organizational level, thereby suggesting that complementarity is a critical factor that should be considered when determining consumer choices, corporate marketing and pricing strategies, and organizational performances.

In this study, we consider the notion of choice complementarity from the users' point of view and focus on the product bundling literature because of the similarity of research situations. Complementarity is considered a key determinant that influences consumers' choices of product bundles [64,106]. If products in a bundle are perceived to be highly complementary to each other, the bundle becomes more appealing to consumers because the bundled products enhance the functionality and utility of each product and offer consumers higher utility [50]. Judgment of the complementarity among bundled products significantly affects consumers' evaluation and purchase intention of the bundle. It has been found that consumers' evaluation of a bundle tend to become favorable when the complementarity between bundled products increases [50]. Moreover, consumers show a higher purchase intention for bundles of complements than for bundles comprising similar or unrelated products [48].

When extended to a service context, individuals will have a more favorable attitude and higher use intention for a bundle of complementary services than a bundle of non-complements. Indeed, online users generally tend to utilize multiple complementary services in the same category concurrently [55]. For instance, Internet users typically use at least two search engines simultaneously when searching for a specific topic or keyword. The use of multiple search engines enables users to leverage the complementarity of the different features of search engines to obtain more relevant search results. In this case, service complementarity plays a key role in users' decision to use multiple search engines [55]. In the SNS service market, SNS operators are continually offering featured functionalities on their sites to improve user experience. They have developed different strengths in providing users with enjoyable and efficient networking services [43]. For instance, Facebook provides the "Timeline" feature to allow users to chronologically tell their life stories and present themselves in a fine manner in the site. Google+ offers the "Circles" feature to help users categorize their connections to share the right things with the right people, similar to that in real life. Thus, given the different features and strengths of SNSs and based on the rationale of complementarity, this study posits that the complementarity between different SNSs is an important driver of user intention to multi-home on SNSs.

2.3. Optimum stimulation level theory

OSL theory (OSLT) is a psychological theory that proposes that all individuals have a tendency to maintain their obtained stimulation at the most pleasant level (i.e., OSL); any deviation from this level will lead individuals to adjust the stimulation [49,70,100,130]. According to OSLT, the OSL for any individual is at some intermediate level and only the stimulation at the OSL is perceived as the most satisfying. When the level of stimulation obtained either from the environment or through internal means falls below the optimum, individuals will become bored and attempt to produce more stimulating inputs by adopting behaviors such as exploration and novelty seeking; when the stimulation is above optimum, individuals will strive to reduce or simplify inputs [53,100,130].

According to OSLT, every stimulus possesses a certain arousal potential, which reflects the stimulation level of the stimulus to an individual [12]. The collative properties (e.g., novelty, complexity, and ambiguity) of a stimulus influence its stimulation level [11,12]. A higher property value will result in a higher stimulation level. Moreover, the stimulation level of a stimulus is not static to individuals but contingent on the stimulation situation. For instance, repetitive exposure decreases the stimulation level of a stimulus because the novelty and uncertainty of the stimulus diminishes.

As the core concept underlying OSLT, OSL is a personality trait that characterizes an individual's general response to environmental stimulation [100]. OSL possesses intra-individual stability but varies across individuals [86,110]. Prior studies have consistently suggested that OSL is an important factor affecting individual responses regarding cognition, affect, and behavior to a stimulus in various situations [9,100,110]. Generally, individuals with high OSL have a stronger need for environmental stimulation. These individuals are more likely to seek out and approach situations and activities that are novel, changing, or complex [61]. Conversely, low-OSL individuals are more likely to feel comfortable with familiar situations and stimuli and withdraw from new or unusual ones [100].

Studies have suggested that individuals with high OSL have a lower level of tolerance for repeated stimulation and will become bored more easily in stable stimulus situations [61]. For instance, high-OSL individuals were found to experience more tedium and form more negative attitudes during repeated exposures to the same advertisement compared with low-OSL individuals [110]. High-OSL individuals are more likely to engage in exploratory behaviors, such as variety seeking that increases stimulation, because of a higher need for excitement and variety [126]. High-OSL individuals are predisposed to hold stimulation value beliefs and take the pursuit of novelty and change as one of the most significant goals in life [104]. Furthermore, high-OSL individuals are more open to new experiences than low-OSL individuals [125]. They are more receptive and perceive more positive outcomes from engaging in new and unfamiliar situations [82]. In light of the review on OSLT and relevant previous studies, OSL is a pertinent personality variable in the SNS multi-homing use context because it relates closely to the exploration and variety seeking in SNS users' multi-homing process. Hence, this study incorporates OSLT to investigate the role of OSL in shaping SNS users' decision to multi-home.

2.4. Theoretical integration

We synthesize the three theoretical perspectives that are delineated above to develop the research model. UGT addresses the motivations of individuals to choose and use a medium, and the notion of choice complementarity explains why individuals adopt multiple products or services simultaneously. These theoretical perspectives both aim to understand and explain the factors that influence individuals' decisions on the choice of products or services. It should be noted that when individuals use a medium, they essentially use the services that the medium affords; thus, an individual's choice of a medium can be viewed as the choice of a service. In the SNS multi-homing use context, both UGT and the

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notion of choice complementarity offer valuable insights on the drivers behind users' multi-homing decision.

UGT can deliver specific information on the motivational factors that stimulate users to adopt SNSs. However, this theory has been developed to understand the use and gratifications of a single medium and does not specifically address the factors regarding the interrelationships among multiple media that influence individuals' media choice. In contrast, the notion of choice complementarity captures the complementary relationship between different SNSs, which is important to users' multi-homing decision. However, this notion cannot offer insights into what constitutes complementarity as perceived by users and is limited to providing practical guidance about operational emphasis to SNS operators. Therefore, in view of the obvious complement between the two theoretical perspectives, we integrate UGT and the notion of choice complementarity to obtain an in-depth understanding of the factors that motivate users to multi-home on SNSs. On the basis of the theoretical integration, we propose that users' perceived complementarity between different SNSs in gratifying their diverse needs is a main driver behind users' multi-homing decision.

Personality traits refer to individuals' enduring predispositions to respond to stimuli across situations [115]. According to the theory of reasoned action (TRA), personality traits are external variables that influence individual beliefs about the outcomes associated with performing a behavior; individual beliefs in turn shape an individual's intention to perform the behavior [36]. Given the ubiquitous influence of personality traits on an individual's decision-making process, personality traits have received growing interest from IS researchers. Studies (e.g. [30]) have drawn theoretical underpinnings from TRA to investigate the effects of personality traits on individuals' adoption decision regarding IT innovations. For instance, Devaraj et al. [30] adopted TRA to theorize the indirect effects of individuals' big five personalities on the intention to use a collaborative technology through the beliefs about the usefulness of technology use. In accordance with the theoretical rationale of TRA, we theorize that OSL, which is a personality trait that characterizes individuals' general response to stimulation, influences user beliefs of complementarity between different SNSs in gratifying their diverse needs; the user beliefs of complementarity in turn influence users' intention to multi-home.

3. Research model and hypotheses

Building on OSLT, UGT, and literature on choice complementarity, we propose a research model of users' multi-homing intention on SNSs (Fig. 1). Based on the synthesis of UGT and the choice complementarity perspective, we argue that users' perceived complementarity of SNSs' abilities to gratify four facets of their needs (i.e., interpersonal communication, self-presentation, information, and entertainment) is a main driver of their intention to multi-home on SNSs. Grounded in OSLT, we propose that users' personality trait (OSL) positively affects their perceived complementarity between SNSs in satisfying the four facets of their needs. The development of the hypotheses is elaborated in the following subsections.

3.1. Perceived complementarity of gratifications in SNS usage and multi-homing intention

In recent years, an increasing number of studies have applied UGT to explain the social and psychological needs that motivate users to participate in SNSs. These studies have provided rich insights into the diverse uses and gratifications underlying SNS usage. For example, Brandtzæg and Heim [14] identified multiple gratifications and mapped them to the UGT framework of McQuail

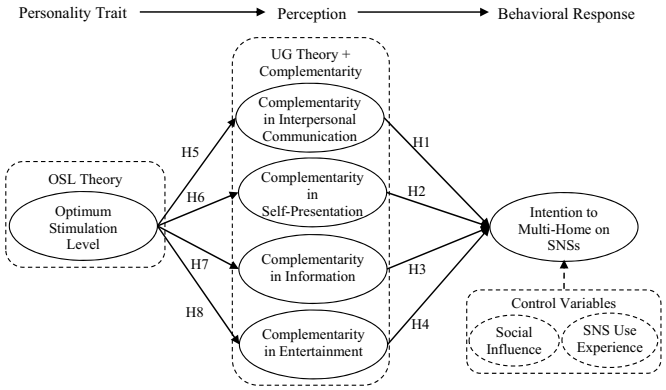

Fig. 1. Research model.

[84]. They showed four motivations for using SNSs: information (e.g., fashion, music, literature, and cultural events), entertainment (fun), social interaction (new relations, close friends, and acquaintances), and personal identity (profile surfing). Choi, Jung, and Lee [21] suggested five motive factors, namely, relationships, self-expression, social status, curiosity, and entertainment. Ku, Chen, and Zhang [65] found that users use SNSs to seek gratifications of information, entertainment, fashion, sociability, and relationship maintenance.

To obtain a comprehensive view of the uses and gratifications in SNS usage, we conducted an extensive search of literature on the uses and gratifications of SNSs. The review results highlight two pertinent points for the current study. First, extant studies have demonstrated the appropriateness of UGT in the SNS use context and its instrumental value in uncovering users' underlying motivational reasons for the choice and use of SNSs. Second, although a number of gratifications with different names and labels have been identified in prior studies, they can generally be classified into four main categories as suggested by McQuail [84][4]: interpersonal communication, self-presentation, information, and entertainment. Table 1 presents the review results on gratifications in SNS usage.

When individuals make product or service choices, they implicitly assess how well the attributes and features provided by various brand alternatives will satisfy their needs [119]. If the current service cannot adequately satisfy their particular needs, they will search for one or more alternatives of higher quality or complementary in need fulfillment. According to the notion of choice complementarity, individuals will choose to adopt multiple services of the same category simultaneously if the adoption of these services can provide higher utility and more value, that is, the complementarity effect. Hwang and Oh [55] suggested that online users use multiple services in the same category concurrently because this can help them leverage the complementary features offered by different service providers.

Since many SNS operators have offered differentiated services, we argue that users multi-home on SNSs because multi-homing usage can better satisfy their diverse needs in terms of interpersonal communication, self-presentation, information, and entertainment. The specific reasons are discussed as follows.

First, many SNSs with free memberships implement different marketing strategies and focus on different user groups [43];

[4] McQuail's four-category classification is among the most widely recognized classification frameworks in the studies on uses and gratifications in media usage [14,87]. The original category labels of McQuail's were integration and social interaction, personal identity, information, and entertainment. We have adapted these categories to the SNS context by making slight changes to the first two category labels, as shown in Table 1.

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Table 1
Gratifications in SNS usage.

Author and year	Gratifications				
	Interpersonal communication	Self-presentation	Information	Entertainment	Others
Raacke and Bonds-Raacke (2008) [99]	Keep in touch with old friends Keep in touch with current friends Make new friends Locate old friends Feel connected	Post/look at pictures Share information about yourself	Learn about events		For academic purposes For dating purposes
Sheldon (2008) [105]	Relationship maintenance Virtual community Companionship			Entertainment	Passing time Coolness
Brandtzæg and Heim (2009) [14]	New relations Friends Socializing Family Free SMS	Profile surfing	Information Debating Sharing/consuming content	Unspecified fun	Time-killing
Park et al. (2009) [91]	Socializing	Self-status seeking	Information seeking	Entertainment	
Dunne et al. (2010) [31]	Communication Friending Interacting with boys	Identity creation and management	Information search	Entertainment	Escapism and alleviation of boredom
Papacharissi and Mendelson (2010) [89]	Companionship Social interaction New friendships	Self-expression	Information sharing	Relaxing entertainment	Habitual pass time Cool and new trend Professional advancement Escape
Cheung et al. (2011) [16]	Maintaining interpersonal connectivity	Social enhancement	Purposive value	Entertainment value	Self-discovery
Zhang et al. (2011) [131]	Network extension Network maintenance Emotional support		Social surveillance	Entertainment	Recognition
Lee and Ma (2012) [67]	Socializing	Status seeking	Information seeking	Entertainment	
Xu et al. (2012) [129]	Affection Coordination Disclosure Immediate access			Entertainment	Stylishness Escape Relaxation
Choi et al. (2013) [21]	Relationships	Self-expression Social Status	Curiosity	Entertainment	
Hossain and Veenstra (2013) [52]	Socializing Relationship maintenance Discussion of news and current events	Express oneself	Social surveillance		Political purposes Share links to outside content
Ku et al. (2013) [65]	Sociability Relationship maintenance		Information	Entertainment	Fashion
Hollenbaugh and Ferris (2014) [51]	Virtual community Companionship Relationship maintenance	Exhibitionism			Passing time

therefore, users' social connections involving friends, families, colleagues, and acquaintances can use different SNSs. In this case, users can remain connected with all their relationships by adopting multiple SNSs. Moreover, some users would also want to keep in touch with their friends abroad but often cannot do so via local SNSs because most of their foreign friends are not on them. In this case, users often choose to adopt the particular SNSs that their foreign friends are using. Second, users want to assert a personal identity that brings liking and association with others by self-presentation on SNSs [60]. Typically, users portray desired images of themselves to others to establish coherent and predictable relationships, thereby permitting them to accomplish their goals in social life [41,96]. Consequently, given that users' social connections can spread across several SNSs [38], users will adopt multiple SNSs to present preferred images of themselves to their different social groups on different SNSs.

Third, many SNS operators have collaborated with celebrities and influential media outlets, such as the *New York Times*, by inviting them to join their SNS platforms to attract and retain users [43]. However, users often find that their favorite celebrities and preferred information sources appear on different SNSs because of the exclusive strategic alliance agreement between SNS operators and celebrities or firms. Hence, users would have to adopt several SNSs to keep themselves updated with the latest happenings of their idols and obtain the most recent news about events. Fourth, to evoke users' favorable experience with using the site, SNS operators have provided many interactive applications and entertainment content on their sites. Operators have shown different strengths in offering users hedonic value. Users can take advantage of this by adopting multiple SNSs to satisfy various aspects of their entertainment needs. For instance, users may be able to have the best game experience on Facebook because the firm has been actively working with third parties, such as Zynga, to provide high-quality games and applications. Furthermore, prior studies have suggested that the utilization of multiple services of the same category perceived as complementary can produce a synergistic effect, such that the utility of adopting multiple services is higher than the sum of utility of each single service [55]. Based on the above arguments, we hypothesize the following:

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Hypothesis 1. Users who perceive higher complementarity between different SNSs in gratifying interpersonal communication needs will have a stronger intention to multi-home on SNSs.

Hypothesis 2. Users who perceive higher complementarity between different SNSs in gratifying self-presentation needs will have a stronger intention to multi-home on SNSs.

Hypothesis 3. Users who perceive higher complementarity between different SNSs in gratifying information needs will have a stronger intention to multi-home on SNSs.

Hypothesis 4. Users who perceive higher complementarity between different SNSs in gratifying entertainment needs will have a stronger intention to multi-home on SNSs.

3.2. Optimum stimulation level and perceived complementarity

According to OSLT, the repeated use of the networking service provided by a particular SNS reduces the stimulation level of the service to users because repetitive use decreases the novelty and uncertainty of the service choice. Compared with low-OSL individuals, high-OSL individuals have a stronger need for stimulation and are more prone to seek and approach situations and activities that are novel, changing, or complex [61]. Therefore, in an SNS use context, driven by the need for a higher level of stimulation, high-OSL users are more likely to seek and explore new SNSs actively. Consequently, high-OSL users create more opportunities for themselves to notice and learn about the different aspects of the service offered on new SNSs. They are more likely to recognize and appreciate the complementary value of new SNSs for their need gratification in relation to currently adopted ones. Moreover, when confronting unfamiliar situations and activities, high-OSL individuals are more likely to feel comfortable and are more open and more receptive [100]. These users are predisposed to perceive more positive outcomes [82]. For SNS use context, when visiting and exploring new SNSs, high-OSL users are more likely to feel comfortable with unfamiliar website interfaces and different service offerings compared with low-OSL users. High-OSL users are also more likely to perceive additional value from the adoption of new SNSs because of their openness and receptiveness; thus, such users are more likely to perceive a high level of complementarity between different SNSs in gratifying their diverse needs. Hence, taken together, as we have decomposed perceived complementarity into four dimensions, we hypothesize the following:

Hypothesis 5. Users' OSL positively influences their perceived complementarity between different SNSs in gratifying interpersonal communication needs.

Hypothesis 6. Users' OSL positively influences their perceived complementarity between different SNSs in gratifying self-presentation needs.

Hypothesis 7. Users' OSL positively influences their perceived complementarity between different SNSs in gratifying information needs.

Hypothesis 8. Users' OSL positively influences their perceived complementarity between different SNSs in gratifying entertainment needs.

3.3. Control variables

To improve the rigor of the findings, we incorporated two suitable control variables from prior studies that may affect users' intention to multi-home on SNSs: social influence and SNS use experience. Social influence has been theorized in IT adoption and use theories, such as the unified theory of acceptance and use of technology [123], as a significant antecedent to users' intention to use technologies. A large body of literature has provided empirical support to that social influence has a significant and direct impact on users' technology use intention [4,83,122,124]. In the current research context, an SNS, being a social network in and of itself, makes the effect of social influence even more salient to users' decision to multi-home on SNSs. Thus, we controlled social influence for users' multi-homing intention.

Prior experience with SNSs can enhance users' self-efficacy in using SNS services. According to social cognitive theory [6], as users become more experienced with SNSs, their knowledge and skills regarding SNS use accumulate, and they will become more confident in their ability to use networking services provided by other SNS operators. Hence, users with more experience are expected to more likely multi-home on SNSs. Therefore, we also controlled users' SNS experience when assessing their multi-homing intention.

4. Research method

4.1. Data collection

The survey method was adopted to test the proposed research model. We collected survey responses from 383 respondents in a large public university in China. These respondents included undergraduate students, graduate students, and part-time MBA students. Participation in the survey was voluntary. To encourage respondents to fill out the questionnaire, they were given a gift voucher for an online bookstore of 20 yuan. Table 2 presents the demographic statistics of the sample. In the collected sample, 50.9% were male, 49.1% were female, 61.1% were full-time students, and 38.9% were part-time MBAs who are working adults. The ratio of full-time students to working adults is approximately 3:2. The majority of the respondents were between 19 and 27 years old (84.3%), and 93.5% of the respondents obtained or are currently acquiring undergraduate- and master-level education. The high-level education and young characteristics of our sample are consistent with the SNS user population in China. A survey by CNNIC [22] shows that college students and company employees constitute the 2 major groups of SNS users in China. Among the user population, 50.3% and 31.3% are college students and company employees, respectively. The ratio of college students to company employees is approximately 3:2. The survey also shows that 52.6% are within the range of 20–29 years old, and 59.1% have college degrees and above. A comparison between our sample and the CNNIC population with regard to gender ratio ($\chi^2(1) = 0.606$, $p = 0.436$) and the ratio of college students to company employees ($\chi^2(1) = 0.048$, $p = 0.826$) did not reveal significant differences. Furthermore, recent studies (e.g., [127]) show user characteristics similar to our study, suggesting that the well-educated and young population comprises the major SNS users in China. Therefore, the sample is deemed appropriate for the study to draw meaningful conclusions.

4.2. Instrument development

We developed the items in the questionnaire primarily by adapting them from prior studies to ensure content validity. Specifically, the items measuring perceived complementarity in the four facets of need fulfillment, namely, interpersonal communication, self-presentation, information, and entertainment, were adapted from Koukova et al. [63]. Social influence and behavioral intention were measured using the items adapted

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Table 2
Demographic statistics.

	Category	Frequency	Percentage
Gender	Male	195	50.9
	Female	188	49.1
Age	19–23	144	37.6
	24–27	179	46.7
	28–31	34	8.9
	32–35	16	4.2
	>35	10	2. 6
Type	Full-time student	234	61.1
	Part-time MBA	149	38.9
Education	Undergraduate	178	46.5
	Master	180	47.0
	PhD	25	6.5
Number of SNSs regularly used	1	55	14.4
	2	130	33.9
	3	110	28.7
	4	54	14.1
	≥5	34	8.9

from Taylor and Todd [114] and Venkatesh et al. [123], respectively. The aforementioned six constructs were all assessed on a seven-point Likert-type scale, which ranges from "strongly disagree" to "strongly agree." OSL was measured using the short form of Change Seeker Index by Steenkamp and Baumgartner [111], which is rated on a seven-point scale with "1" = completely false and "7" = completely true. Finally, SNS use experience was measured as the number of years of using SNS services. Appendix A lists the final items used in this study along with the item sources.

Back translation method was used to ensure consistency between the Chinese and original English version of the instrument [27]. The initial version of the instrument was examined by a panel of experts consisting of three IS professors and six doctoral students to assess the content validity and determine any ambiguities or potential sources of error. Subsequently, a pilot test was conducted among 21 SNS users with at least half a year of SNS experience. On the basis of the respondent feedback, the instrument was further refined to obtain the final version.

4.3. The measurement model

The partial least squares (PLS) method, as implemented in SmartPLS version 2.0.M3 [102], was chosen to test the measurement and structural models. The assessment of the measurement model included testing the discriminant validity, convergent validity, and reliability of the latent variables. Measurement reliability was assessed using composite reliability and Cronbach's alpha [88]. The composite reliability and Cronbach's alpha of all constructs are above 0.8, which are higher than the suggested threshold value of 0.7 [88]. This result indicated a satisfactory internal consistency of the measures (Table 3). Convergent validity is established by the presence of the average variance extracted (AVE) higher than 0.5 [37] and the loadings of items on their intended constructs that is significant and at or above 0.707 [17,39,88]. All the AVEs in Table 3 are higher than 0.5. All item loadings are above 0.707, and the loadings of items on their respective constructs (in bold) in Appendix B are all significant at $p < 0.001$. Thus, the constructs in this study possess adequate convergent validity.

Finally, for adequate discriminant validity, the square root of AVE of each construct should be higher than its correlations with other constructs [37,39]. Table 3 shows that the diagonal elements in bold are higher than the off-diagonal elements that belong to the same row or column, thereby satisfying the discriminant validity requirement. Another criterion for adequate discriminant validity requires that each item should have a higher loading on its intended construct than on the other constructs and that the loading should also be higher than the loadings of items that do not measure the construct [39]. As shown in Appendix B, the item loadings satisfied this requirement, thereby suggesting adequate discriminant validity.

4.4. Common method bias

Data for all variables for this study were self-reported and collected from a single survey; hence, common method bias may pose a threat to the validity of the findings. We used several techniques to alleviate and test for common method bias. First, we emphasized the anonymous nature of the survey to the respondents at the beginning of the questionnaire. We also assured respondents that they should answer questions honestly on the basis of their beliefs and that there are no right or wrong answers. These procedures reduced respondents' evaluation apprehension and mitigated the social desirability bias [93]. Second, we used multiple scale anchors (e.g., strongly agree and completely true) and formats (e.g., Likert and semantic differential). This approach created a methodological separation of measurement and reduced the consistency motif and demand characteristics [93]. Third, we performed the widely employed Harman's one-factor test [94]. The exploratory factor analysis results indicate the presence of five factors with eigenvalues higher than one. The first of the five factors accounted for merely 38.3% of the variances. The results did not show a single factor accounting for the majority of variances in all items, thereby suggesting that common method bias is not a serious concern in this study.

4.5. The structural model

The structural model was assessed to determine the significance of the posited paths and its explanatory power based on the amount of variance accounted for in the endogenous variables. Bootstrapping with 500 subsamples was performed to estimate

Table 3
Measurement reliability and validity.

	Cronbach's α	CR	AVE	BI	EXP	OSL	PCE	PCI	PCIC	PCSP	SI
BI	0.94	0.96	0.89	**0.94**							
EXP	1.00	1.00	1.00	0.11	**1.00**						
OSL	0.89	0.92	0.68	0.17	0.03	**0.83**					
PCE	0.94	0.97	0.94	0.48	0.07	0.14	**0.97**				
PCI	0.92	0.96	0.92	0.63	0.05	0.22	0.61	**0.96**			
PCIC	0.89	0.95	0.90	0.67	0.09	0.23	0.43	0.57	**0.95**		
PCSP	0.90	0.94	0.83	0.54	0.18	0.21	0.48	0.56	0.61	**0.91**	
SI	0.89	0.93	0.82	0.47	0.14	0.24	0.31	0.34	0.39	0.31	**0.90**

CR: composite reliability; square roots of AVEs are the diagonal elements in bold; BI: intention to multi-home on SNSs, EXP: SNS use experience, OSL: optimum stimulation level, PCE: perceived complementarity in entertainment, PCI: perceived complementarity in information, PCIC: perceived complementarity in interpersonal communication, PCSP: perceived complementarity in self-presentation, SI: social influence.

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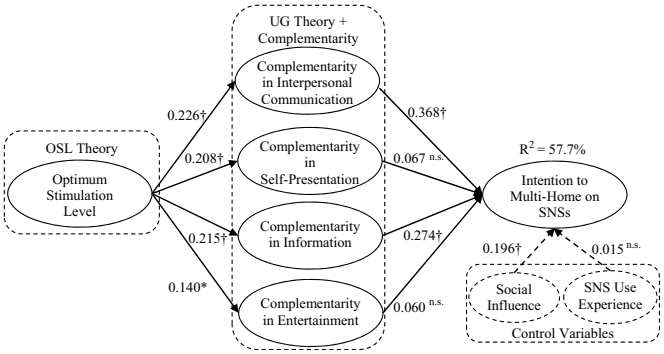

Fig. 2. Structural model results. *Note*: n.s. insignificant at $p < 0.05$, *significant at $p < 0.05$, †significant at $p < 0.0001$.

the statistical significance of each path coefficient using *t*-tests [18]. Fig. 2 depicts the structural model results. Among the four complementarity perceptions with respect to fulfilling users' gratifications from SNS use, the complementarity in interpersonal communication and information significantly affects users' intention to multi-home on SNSs, whereas the complementarity in self-presentation and entertainment does not have a significant effect. Therefore, hypotheses H1 and H3 were supported but not hypotheses H2 and H4. Consistent with our expectation, OSL has a significant and positive effect on the four complementarity perceptions, thus providing support for hypotheses H5–H8. Among the control variables, social influence significantly affects users' multi-homing intention on SNSs. Overall, a substantial proportion (57.7%) of variance in users' multi-homing intention was accounted for by the variables in the model. Excluding the control variables, 54.5% of the variance in multi-homing intention was accounted for by the theoretical variables comprising the four complementarity constructs.

To assess the effects of complementarity constructs on users' multi-homing intention statistically, we used Cohen's [25] formula to calculate the effect size f^2 and conducted a Pseudo *F*-test to determine the statistical significance[5] [113]. As shown in Table 4, the addition of the four complementarity constructs has a large effect size of 0.823 [25] and significantly increases the explained variance in multi-homing intention, thereby demonstrating the substantial power of the complementarity constructs in predicting users' multi-homing intention.

To assess the indirect effect of OSL on multi-homing intention via perceived complementarity, we employed the bootstrapping method [97,132]. Bootstrapping is superior to traditional methods, such as the Sobel test and the causal steps approach, because it is a non-parametric resampling procedure and does not impose the assumption of symmetry or normality of the sampling distribution of the indirect effect [77,97]. Furthermore, this method possesses higher statistical power while maintaining a reasonable Type I error rate [77,97]. Given these advantages, bootstrapping has been recommended by many researchers (e.g., [77,132]) for mediation tests. Bias-corrected (BC) bootstrap was chosen over other bootstrap methods, such as percentile bootstrap, because BC bootstrap corrects for bias in the central tendency of the estimate, has higher statistical power, and has more accurate confidence intervals [77,97,128]. The resampling times used in this study was 5000, as recommended by Preacher and Hayes [97].

Table 5 presents the mediation test results, which shows that the 95% confidence intervals of the mediation effects of perceived complementarity in interpersonal communication and information do not include zero, thus suggesting significant mediation effects. The direct effects are both insignificant. According to the decision tree of Zhao et al. [132], we concluded that perceived complementarity in interpersonal communication and information both *indirectly-only* mediate the effect of OSL on multi-homing intention. Neither perceived complementarity in self-presentation nor complementarity in entertainment contributes to the indirect effect beyond the two complementarity constructs. Moreover, the 95% confidence interval of the total indirect effect does not include zero. Therefore, consistent with the rationale of TRA, the four complementarity perceptions as a whole significantly mediate the effect of the personality trait OSL on users' behavioral intention of multi-homing on SNSs.

Table 4
Effect size and Pseudo *F*-test result.

Dependent variable	R^2 (full model)	R^2 (excluded)	f^2	Pseudo *F*-statistic	Degrees of freedom
Multi-homing intention	0.577	0.229	0.823	311.09†	(1, 379)

† Significant at $p < 0.0001$.

Table 5
Mediation test results.

	Point estimate	Confidence interval (95%)	Direct effect	Mediation type
PCIC	0.084	(0.045, 0.131)	−0.040n.s.	Indirect-only
PCSP	0.015	(−0.004, 0.043)	−0.036n.s.	Non-mediation
PCI	0.060	(0.030, 0.098)	−0.039n.s.	Indirect-only
PCE	0.008	(−0.006, 0.028)	−0.035n.s.	Non-mediation
Total	0.167	(0.102, 0.234)	−0.040n.s.	Indirect-only

n.s. insignificant at $p < 0.05$.

5. Discussion

Our empirical investigation offers several insights to understand the factors that affect users' decision-making regarding multi-homing on SNSs. From the users' perspective, not only is social influence important to users' decision to multi-home on SNSs, but perceived complementarity and personality trait (i.e., OSL) can also have significant effects on their adoption decision of multiple SNSs. Specifically, our results suggest that the complementarity between different SNSs with regard to gratifying users' needs is a main driver for users to multi-home on SNSs. Product or service choice is a rational decision-making process, and individuals will explicitly or implicitly evaluate and compare the costs and benefits resulting from their decisions [101]. If the benefits outweigh the costs, the adoption of the product or service is considered valuable and worthwhile. Within the context of multi-homing on SNSs, users will assess whether additional value is achieved before deciding to participate in an SNS other than the one(s) currently used. Complementarity literature suggests that the increased value through adopting another product or service of the same category is derived from the complementary relationship between the other product or service and existing ones. Given that the SNS industry is changing and is still in its nascent stage of development, SNS firms are taking various actions to establish their foothold and have attempted to position themselves differently in the market [43]. It is likely that users cannot fully satisfy their needs, such as social interaction and information acquisition, on one SNS platform and need to seek other SNSs. Therefore, to complement different aspects of need fulfillment, users would take advantage of the differentiated and featured service offerings provided on several SNSs.

[5] f^2 is calculated as $(R^2_{full} - R^2_{excluded})/(1 - R^2_{full})$. The pseudo *F*-statistic is calculated as $f^2 * (n - k - 1)$, with one, $(n - k)$ degrees of freedom, where n is the sample size, and k is the number of independent variables in the model.

Among the four main uses and gratifications examined in this study, only perceived complementarity in satisfying interpersonal communication and information needs has a significant effect on users' intention to multi-home on SNSs. The complementarity in entertainment and self-presentation does not significantly affect users' multi-homing intention. Prior studies have suggested that the utilitarian value reflected in perceived usefulness [98] and social capital [34], as well as the hedonic aspect reflected in enjoyment [15,54,72], play a significant role in users' acceptance of an SNS. The present study confirms the important role of utilitarian value, which is manifested in interpersonal communication and information acquisition, in influencing users' adoption of multiple SNSs. The results also suggest that the significant role of hedonic benefits (i.e., entertainment) diminishes in predicting users' multi-homing decision. One plausible explanation for this finding is that among the various gratifications that individuals seek to complement by using additional SNSs, the prominent ones are not to assert a personal identity or be entertained but to establish and enhance their social relationships and acquire valuable and rich information. That is, the increased utility that users value when deciding to adopt an additional SNS resides in the informational and social communication aspects of their need fulfillment and not in the personal presentation or entertainment aspects. The perceived added value in self-presentation and entertainment provided by an additional SNS is not sufficiently appealing to stimulate users to adopt another SNS other than their existing ones.

Finally, OSL has a significant and positive effect on users' perceived complementarity between different SNSs about need gratification. According to OSLT, all users have the tendency to maintain their obtained stimulation at the most pleasant level, that is, OSL. Compared with low-OSL users, those with high OSL have a stronger need for stimulation, which can be derived from the novelty, uncertainty, and complexity of a stimulus [126]. When users repeatedly use the same SNS, the novelty and uncertainty of the site choice decrease, that is, the stimulation level obtained from the SNS use decreases. With the continued use of the SNS, the stimulation level continues to decrease and is much easier to fall below the optimal stimulation level of high-OSL users compared with low-OSL users. This suggests that high-OSL users are more likely to feel tedious and saturated about using the same SNS. Therefore, to satisfy a stronger need for stimulation, high-OSL users are more likely to seek and try new and unfamiliar SNSs than low-OSL users. Consequently, high-OSL users create more opportunities to learn and recognize the different aspects of the new SNSs. Furthermore, since the novelty and uncertainty inherent in new SNSs increase the stimulus inputs, driven by a stronger desire for stimulation, high-OSL users are more prone to feel comfortable and are more receptive to the new and unfamiliar SNSs. These users are more likely to appreciate the differential service offerings and thus perceive the extra value from the use of the new SNSs other than their current SNSs. Hence, as evidenced by the findings, high-OSL users perceive a higher level of complementarity between different SNSs in gratifying their needs.

5.1. Theoretical implications

This study has several theoretical contributions. First, to our knowledge, this study is among the earliest studies to investigate users' multi-homing use of SNSs. Previous studies on SNS use have extensively explored the underlying motivations of users' adoption, continued, and discontinued use of SNSs. Little attention has been given to the question regarding the underlying reasons for users' concurrent use of multiple SNSs. Although multi-homing use has been fairly prevalent among SNS users [38,56,117], we still have limited knowledge of the drivers behind a user's decision to multi-home. This study contributes by developing a theoretical model of users' multi-homing intention on SNSs. Furthermore, operators are striving to attract users from competitors because of severe competition in the SNS market. Multi-homing use suggests that potential users can be successfully obtained from competing SNSs; hence, a theoretical understanding of the underlying drivers that stimulate users to multi-home is of particular importance. This study contributes to our understanding of the drivers of SNS users' multi-homing decision by theorizing the effects of the personality trait OSL and four types of perceived complementarity on users' multi-homing intention. Additionally, given that users' multi-homing behavior has a direct bearing on the formulation of firms' competition strategies, such as pricing and marketing [46,81,92], our study performed a worthwhile exploratory attempt in this important topic. This attempt creates new opportunities to enhance our knowledge of user behaviors in an SNS or in the social media context. Hopefully, this study will draw the interest of both academics and practitioners in understanding users' multi-homing behavior on SNSs and other forms of online service platforms.

Second, this study contributes to the IS adoption and use literature by investigating a type of concurrent IS usage behavior through different theoretical lenses. Previous studies on IS adoption and use are mostly based on traditional models, such as TRA, technology acceptance model (TAM), theory of planned behavior (TPB), or their combinations, decompositions, or extensions (e.g., [54,114]). Scholars (e.g., [5,10,120]) have criticized that the heavy reliance on this research paradigm has largely limited our vision and knowledge accumulation in the IS field. Notably, the intense focus on the traditional models has diverted IS researchers' attention away from other important user behavior [10]. Moreover, despite the robust support in various domains, the traditional models lack specificity and adequacy [5,10,120]. For instance, TAM demonstrates the importance of both perceived usefulness and perceived ease of use to the acceptance of a system but fails to answer the basic question of what actually makes a system useful and easy to use. In light of these issues, our study goes beyond the traditional IT acceptance models by applying relevant theories from other disciplines to investigate an important yet understudied online user behavior, namely, multi-homing on SNSs. Specifically, our study broadens the vision of IS adoption and use research by examining the same-category multiple-system concurrent adoption issue in an SNS context. Consequently, our study expands our previous understanding of the adoption of a single system to a multiple-system context, in which it was found that perceived complementarity between different IS of the same category in gratifying users' diverse needs constitutes a main driver of users' multi-homing intention. Furthermore, our study is also novel to the extent that it advances IS adoption and use research by drawing upon the OSL and UG theories and the notion of choice complementarity instead of adapting TAM, TPB, and the like to develop a theoretical model of users' multi-homing intention on SNSs. In this sense, our study provides some new insights into the theoretical modeling of user behavior and echoes prior scholars' (e.g., [5,10]) calls for theoretical refinement on IT adoption and use.

Third, this study contributes to the literature on choice complementarity in two ways by integrating UGT. In contrast to prior studies on perceptual (vs. objective) complementarity (e.g., [55,63]), which examined perceived complementarity in a general manner (individuals were asked to rate their overall perceptual level of complementarity), the present study identifies the complementary relationship between the notion of choice complementarity and UGT and combines the two research perspectives to propose the perceived complementarity between SNSs comprising four dimensions: perceived complementarity in gratifying users' interpersonal communication, self-presentation,

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information, and entertainment needs. Our results reveal that the complementarity with regard to interpersonal communication and information needs has a statistically significant effect on users' decision to multi-home on SNSs, whereas complementarity in terms of self-presentation and entertainment does not have such an effect. Therefore, with UGT integration, this study theoretically and empirically suggests that a fine-grained examination of complementarity is necessary and beneficial because it helps differentiate the effects of distinct aspects of complementarity and provides detailed insights into the complementarity effect on individual choices of products and services. Furthermore, the bulk of extant studies on complementarity has focused on the complementary relationship between resources, products, and services of distinct categories. Less attention has been given to the complementarity derived from entities of the same category (except for [55]). Different from [55], which uses an analytical modeling and simulation method, this study applies the PLS approach to data collected from real SNS users and empirically demonstrates the significant effect of complementarity between services of the same category. In this sense, this study enhances our understanding of the crucial role of complementarity in influencing individual decision to use multiple services in the same category concurrently.

Fourth, this study contributes and adds to the OSL theory. OSL has been extensively studied in the marketing and consumer behavior literature but has seldom been applied to the IS discipline (except for [75,78]). Our study extended the application scope of OSL theory to the social media context by investigating the effect of OSL on SNS users' multi-homing intention. Although OSL theory has theorized and empirically confirmed the effect of OSL on individual behaviors and decision making, especially those with a strong exploratory component (e.g., variety seeking), the internal process and underlying mechanism remain unclear [45]. This study provides theoretical insights into the mechanism underlying the OSL effects on individual behavior by following the rationale of TRA to validate the mediating effects of user beliefs about complementarity on the influence of OSL on users' multi-homing intention. More significantly, this study suggests such a viable approach as employing relevant theories from personality and social psychology for researchers interested in exploring the influence mechanism of OSL on individual behavior. Finally, as suggested by the application of the stimulus–organism–response model to IS research (e.g., [3,107]), IT artifacts and their constitutive elements and associated characteristics can all be considered a stimulus. As a personality trait characterizing individuals' general response to stimulation, OSL should play a fundamental role in affecting individual responses regarding cognition, affect, and behavior to an IT artifact and its elements and characteristics. Hence, OSL theory has tremendous theoretical appeal as a lens to understand various individual responses in the IS context. Our study has applied OSL theory and verified the significant effect of OSL on individual beliefs regarding the complementarity between different SNSs in need gratification. We believe that the application of OSLT to the IS discipline can help IS researchers glean richer and more in-depth insights into human behavior and decision-making in IT contexts.

5.2. Practical implications

This study provides several important managerial implications for SNS practitioners. First, given that perceived complementarity is a main driver of users' intention to multi-home on SNSs, we recommend SNS firms to use a complement strategy to compete and gain sustained growth in user base and website traffic. Our results showed that users use another SNS because they believe that using the SNS can complement their need gratification on currently adopted ones. Hence, SNS firms, including established firms and new start-ups, should identify the facets of user needs that have yet to be satisfied or adequately gratified in the current SNS market. To this end, surveys and in-depth interviews with users can be conducted. Press news and industry reports, particularly those regarding users' opinions and suggestions about the use experience and need gratification on SNSs, can also be utilized. Given that the website interface is the primary conduit in which SNS firms serve and interact with users, SNS firms should make efforts in website design in terms of functionality, features, and design styles to support the complement strategic emphasis [28]. Google+ can be an illustrative example. Before the release of Google+, Google noticed that users have long suffered information oversharing (i.e., sharing with irrelevant or wrong audiences) and the resulting privacy concern issue, which have caused much inconvenience to users' online interpersonal communication process [57,68]. To address these issues, Google+ introduced the "Circles" functionality to the site and positioned it as one of the most unique features of its services. Circles has proven to help users better manage their online social networks and support a much more pleasant online communication experience on the site. This feature complements users' interpersonal communication need gratification in the current SNS market and is a differentiating feature of the success of Google+ in the acquisition and retention of users [57]. Indeed, our recommendation on the complement strategy is consistent with [92], which suggests that a new entrant can take advantage of product complementarity to weaken an incumbent's first-mover advantage and compete head-on with the incumbent to survive and prosper in the market.

Second, our findings suggest that when developing service complementarity, SNS firms should focus on the complementary fulfillment of users' information and interpersonal communication needs than self-presentation and entertainment facets. Concerning interpersonal communication, SNS firms should improve the capacity to support and complement users' socialization needs to stimulate users to adopt their sites. To this end, SNS firms may initiate wide-ranging advertising campaigns to promote their sites in both online and offline channels, thereby increasing public awareness of the sites. For international SNS firms (e.g., Facebook) attempting to expand into a new local SNS market, highlighting the advantage of being global, such as complementing users' need to connect with foreign friends from most countries in the world, is more effective in attracting potential users from local competitors. For domestic SNS firms that focus on the cultivation of local SNS markets, such as V Kontakte in Russia and Tencent Qzone in China, emphasizing popularity in the local market as well as a good understanding of the users and local culture are more suitable approaches for developing a user base.

Third, the significant effect of users' perceived complementarity between SNSs in satisfying information needs suggests that the utilitarian value that an SNS brings to users in information acquisition is an important factor that users consider when deciding to use the SNS other than their currently adopted ones. To increase the informational value of the site, SNS firms should actively engage popular celebrities, corporate leaders, news and media companies, and other renowned firms as partners in the SNS platform. For instance, Facebook has leveraged its industry leadership to enhance and broaden its alliances with various firms to heighten its informational value to site users. SNS firms can provide users with complementary information sources that are unavailable on other SNSs by using exclusive strategic alliance agreements. In this case, SNS firms can publicize and promote the complementary informational value offered on the site to attract prospective users. Social networks on SNSs are also effective generators and efficient filters of information [69]. SNS firms can take advantage of users' social networks, which generally involve

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heterogeneous relationships comprising friends, families, colleagues, and acquaintances, to provide rich and targeted information that fits users' tastes and preferences. For instance, Google+ can exploit friends grouping information, which resides in the "Circles" created by users, to improve the information offerings. Moreover, intelligent technologies and algorithms (e.g., [7]) can be used to filter redundant and irrelevant information to reduce the information noise and load for users, thereby improving the efficiency of users' information acquisition. Through these means, SNS firms can enhance their performance and offer complementary value in satisfying users' information needs.

Fourth, this study suggests ways of market segmentation for SNS firms by showing the significant role of OSL in shaping users' decision to multi-home. As a personality trait that reflects individuals' general response to stimulation, OSL has its biological base and is inherently associated with individuals' demographic characteristics, such as gender and age [133]. Researchers (e.g., [100,110,112]) have consistently found that males generally possess higher OSL than females and young people score higher on OSL than old people. Considering the association of OSL with demographic variables, SNS firms can easily segment users by taking into account users' gender and age information when entering a new market and expanding user base. For instance, SNS firms can simply segment the market into male and female, or more precisely segment the market by adding the age dimension. Users of different segments have different levels of OSL. High-OSL users have a stronger desire to seek novelty and try out new and unfamiliar things, whereas low-OSL users are conservative and tend to avoid risks. Therefore, SNS firms should place different emphases when designing marketing strategies and implementing promotional activities for various segments. For instance, for a high-OSL segment comprising young males, SNS firms, such as Facebook, should highlight the innovative aspects of their service when entering a new market to entice these users to explore and adopt the sites. In contrast, for a low-OSL segment comprising middle-aged females, taking the same strategy as for a high-OSL segment is not appropriate. SNS firms should reduce users' perceived risk and uncertainty by emphasizing superior industry expertise and signaling market leadership to stimulate users to try and learn about the sites.

5.3. Limitations and future research

Our study has some limitations and several unanswered questions that suggest avenues for future research. First, although we have identified some of the important factors that are linked to users' intention to multi-home on SNSs, additional variables can be explored to improve the robustness of the research model. For instance, our research did not consider the effects of dark side factors regarding SNS usage on users' multi-homing intention.[6] Previous studies have suggested that the dark side variables, such as addiction [116], stress [80], and social overload [79], can exert a significant influence on users' decision to use an SNS. These variables might also have an influence on users' multi-homing intention. Future research can build on our model to explore these factors to provide richer insights and advance our understanding of users' multi-homing on SNSs.

Second, our data were collected in a single cross-sectional survey; thus, we cannot claim causality for our results. The significant relationships reported in this study represent mere associations between constructs. These relationships can only be interpreted as causal on the basis of theoretical inferences. Moreover, multi-homing intention, instead of actual behavior, was assessed as the final outcome variable because of the cross-sectional design of this study. Future research may obtain longitudinal data to examine the causality question and transition of users' multi-homing intention into actual behavior. It is noteworthy that although a number of studies have demonstrated that behavioral intention is an important antecedent to actual behavior, recent studies revealed that the transference of intention into action is contingent upon individual characteristics, such as habit [73,95], and contextual factors, such as influences from individuals' social networks [121]. Thus, future research should consider these factors when studying users' multi-homing behavior in a longitudinal setting.

Third, our sample was drawn from undergraduate, graduate, and part-time MBA students from a Chinese university. The high-level education and young characteristics of our sample are consistent with the Chinese SNS user population and are similar to other empirical studies conducted in China. Therefore, our sample has adequate representativeness. Nevertheless, caution should be exercised in generalizing the results to other user populations, such as under-educated adults [26]. Future research should collect data from a more heterogeneous sample to validate our findings.

Fourth, although this study has provided some insights into the factors affecting users' multi-homing intention on SNSs, promising questions of interest remain for researchers to investigate. Given that users participate in multiple SNSs by exhibiting distinct usage patterns across different SNSs, they may post, share, view, reply, and play differently in both quality and quantity [129]. For instance, a typical user who multi-homes on two SNSs may be more active in sharing on one SNS but more prone to only view content on the other. In addition, users may spend different amounts of time on different SNSs, and the frequency of their visits to the sites may also be different. Because user interaction and site stickiness are critical to the long-term success of SNSs [15,44], the factors that cause these different usage patterns should be identified. Future studies can consider site design, individual differences (e.g., personality [15] and habits), and competing relationships between SNSs to perform an in-depth investigation and provide pertinent suggestions for site designers and operators to increase user participation and interactions on their sites. Moreover, our study confined the research scope to open-to-all general SNSs, such as Facebook and Google+; thus, SNSs focusing on a particular domain, such as the professionally oriented LinkedIn and picture-sharing SNSs (e.g., Pinterest and Flickr), were excluded. Future research could take a broader research scope and further examine our research model in a wider SNS context to generate more fruitful insights into users' multi-homing use of diverse SNSs.

6. Conclusion

Given the increasingly severe competition in the SNS market and high dependency of SNS revenues on user base and site traffic, understanding the mechanism to retain and attract users from competitors to their own sites is an important issue for SNS operators. This study identified and investigated the multi-homing behavior of SNS users. We found that users' personality trait (OSL) positively affects their perceived complementarity between SNSs about satisfying the four facets of their needs, namely, interpersonal communication, self-presentation, information, and entertainment needs. Among the four dimensions of perceived complementarity, only interpersonal communication and information aspects have significant effects on users' intention to multi-home on SNSs. Moreover, users' complementarity perceptions mediate the effect of OSL on multi-homing intention. Our study provides theoretical insights into the phenomenon of users' multi-homing on SNSs and yields practical implications for SNS managers and marketers to devise appropriate strategies to survive and thrive in the competitive SNS market.

[6] We thank an anonymous reviewer for suggesting this point.

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Appendix A

Survey items and sources.

Constructs	Items	Key sources
Optimum stimulation level (OSL)	I like to experience novelty and change in my daily routine. I like a job that offers change, variety, and travel, even if it involves some danger. I am continually seeking new ideas and experiences. I like continually changing activities. When things get boring, I like to find some new and unfamiliar experience.	[111]
Complementarity in interpersonal communication (PCIC)	Using multiple SNSs is more useful to manage my social communications than using just one single SNS.[a] There is additional value in using multiple SNSs for meeting my interpersonal communication needs compared with using only one of them.	[63]
Complementarity in self-presentation (PCSP)	Using multiple SNSs is more useful to present myself than using just one single SNS. Using multiple SNSs is more useful to share myself than using just one single SNS. There is additional value in using multiple SNSs for meeting my self-presentation needs compared with using only one of them.	[63]
Complementarity in information (PCI)	Using multiple SNSs is more useful for me to obtain information than using just one single SNS. There is additional value in using multiple SNSs for my information acquisition compared with using only one of them.	[63]
Complementarity in entertainment (PCE)	Using multiple SNSs is more useful for me to obtain entertainment than using just one single SNS. There is additional value in using multiple SNSs for meeting my entertainment needs compared with using only one of them.	[63]
Social influence (SI)	People who influence my behavior think I should use the SNSs they are using. People who are important to me think I should use the SNSs they are using. My peers/friends/classmates think I should use the SNSs they are using.	[114]
Behavioral intention (BI)	I intend to use multiple SNSs in the future. I predict that I would not use multiple SNSs in the future.[b] In the future, I plan to use multiple SNSs.	[123]

[a] The beginning of the questionnaire indicates that the SNSs in this survey refer to open-to-all general SNSs, such as Facebook, Google+, Renren, and Mixi, which cater to diverse audiences and primarily serve the purpose of creating and maintaining relationships with known or unknown offline friends and family. The survey does not address professionally oriented (e.g., LinkedIn), dating-oriented (e.g., zhenai.com, match.com), picture-sharing (e.g., Pinterest, Flickr), and microblogging SNSs (e.g., Twitter).
[b] Reverse-coded items.

Appendix B

Loadings and cross loadings of measurement items of latent variables.

	BI	EXP	OSL	PCE	PCI	PCIC	PCSP	SI
BI_1	**0.957**	0.111	0.174	0.476	0.624	0.653	0.532	0.495
BI_2	**0.927**	0.060	0.150	0.436	0.566	0.621	0.484	0.391
BI_3	**0.945**	0.124	0.170	0.436	0.577	0.621	0.501	0.452
EXP_1	0.105	**1.000**	0.034	0.067	0.053	0.086	0.178	0.141
OSL_2	0.198	0.023	**0.834**	0.155	0.216	0.219	0.203	0.241
OSL_3	0.129	0.025	**0.833**	0.088	0.140	0.155	0.139	0.228
OSL_4	0.176	0.023	**0.857**	0.152	0.192	0.187	0.210	0.187
OSL_5	0.122	0.075	**0.852**	0.074	0.167	0.189	0.167	0.160
OSL_6	0.069	−0.005	**0.758**	0.088	0.156	0.174	0.118	0.181
PCE_1	0.449	0.069	0.136	**0.970**	0.580	0.393	0.460	0.306
PCE_2	0.478	0.062	0.136	**0.973**	0.601	0.432	0.475	0.303
PCI_1	0.617	0.049	0.196	0.586	**0.962**	0.565	0.551	0.331
PCI_2	0.584	0.052	0.217	0.583	**0.959**	0.538	0.521	0.315
PCIC_3	0.619	0.108	0.208	0.390	0.542	**0.945**	0.569	0.374
PCIC_4	0.650	0.058	0.221	0.415	0.547	**0.950**	0.590	0.373
PCSP_1	0.473	0.199	0.222	0.468	0.518	0.539	**0.910**	0.279
PCSP_2	0.484	0.146	0.150	0.426	0.485	0.532	**0.907**	0.276
PCSP_3	0.512	0.142	0.197	0.423	0.522	0.601	**0.919**	0.293
SI_1	0.468	0.131	0.241	0.298	0.311	0.373	0.289	**0.922**
SI_2	0.422	0.148	0.227	0.275	0.302	0.361	0.283	**0.925**
SI_3	0.391	0.101	0.184	0.274	0.299	0.333	0.267	**0.860**

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