Asia Pacific Journal of Information Systems
Vol. 32 No. 3 (September 2022), 601-629

ISSN 2288-5404 (Print) / ISSN 2288-6818 (Online)
https://doi.org/10.14329/apjis.2022.32.3.601

A Multidimensional View of SNS Usage: Conceptualization and Validation

Edgardo R. Bravo[a,*], Christian Fernando Libaque-Saenz[b]

[a] *Associate Professor, Engineering Department, Universidad del Pacífico, Peru*
[b] *Associate Professor, Engineering Department, Universidad del Pacífico, Peru*

ABSTRACT

Social networking sites (SNSs) have become an essential part of people's lives. It is thus crucial to understand how individuals use these platforms. Previous literature has divided usage into numerous activities and then grouped them into dimensions to avoid excessive granularity. However, these categories have not been derived from a uniform theoretical background; consequently, these dimensions are dispersed, overlapping, and disconnected from each other. This study argues that "SNS usage" is a complex phenomenon consisting of multiple activities that can be grouped into dimensions under the umbrella of communication theories and these dimensions are related to each other in a particular multi-dimensional architecture. "SNS usage" is conceptualized as a third-order construct formed by "producing," "consuming," and "communicating." "Producing," in turn, is proposed as a second-order construct manifested by "commenting," "general information sharing," and "self-disclosure." The proposed model was assessed with data collected from 414 USA adult users and PLS-SEM technique. The results show empirical support for the theorized model. SNS providers now have this architecture that clarifies the role of each dimension of use, which will allow them to design effective strategies to encourage the use of these networks.

Keywords: SNS Usage, Multidimensional Construct, Higher-order Variables, Superordinate, Aggregate

Ⅰ. Introduction

Social networking sites (SNSs) have become an essential part of people's daily lives (O'Leary and Volkmer, 2021). These platforms have been widely adopted, reaching 3.6 billion users in 2020 and are expected to reach 4.41 billion users by 2025 (Statista, 2020b). That is, 74.8% of the population aged 13 or more uses social media (Datareportal, 2022a). Users spent a daily average of 2 hours 27 minutes on these platforms (Datareportal, 2022a), while accessing an average of 7.5 SNSs each month (Datareportal, 2022a). The pandemic further boosted these numbers, with a reported increase in social media use (43%), mes-

*Corresponding Author. E-mail: er.bravoo@up.edu.pe

senger services (42%), creating and uploading videos (16%), among other activities (Datareportal, 2022a).

The abovementioned trend represents potential opportunities for commerce. For example, Facebook may reach 562.1 million users with advertisements, while more than a billion users visit its Marketplace each month (Datareportal, 2022c). For its part, YouTube may reach 2.56 billion users with advertisements, representing 32.4% of the global population (Datareportal, 2022e). In the case of Instagram, this number reaches 1.48 billion users (Datareportal, 2022b). This number can be further disaggregated as follows: 675.3 million users can be reached by Instagram reels, 1.07 billion users by Instagram stories, 792.4 million users by Instagram Explore Tab, and 187.6 million users by Instagram Shop (Datareportal, 2022b). Lastly, on the TikTok platform, around 884.9 million users can be reached for advertising (Datareportal, 2022d).

This situation highlights the importance of understanding user activities when interacting with SNSs. Indeed, an adequate targeting of advertisements is not only based on demographics, psychographic profiles, searching and location-based information, but also on users' activities (Partridge and Begole, 2011). Thus, understanding users' SNS usage is important to correctly design marketing strategies by both SNS managers and users employing these sites as commerce platforms.

Despite its relevance, and although the conceptualization of "SNS usage" has evolved since its inception, it still remains incomplete (Aladwani, 2014). Three approaches can be distinguished in the operational definition of "usage." The traditional and most spread perspective has defined "usage" as a monolithic behavior related to the interaction between the user and the SNS. This approach has been operationalized as the global frequency of use and time per day spent using a SNS (Ellison et al., 2007; Rauniar et al., 2014).

Although the traditional approach has contributed to understanding the SNS usage phenomenon, practical and academic literature suggests this behavior comprises various facets in a more complex arrangement. Statista (2020a) reports that users engage with numerous micro-tasks on these platforms, for example: sending messages, browsing posts, posting information, interacting with others in a group, or watching other people's stories. Because the traditional perspective does not capture the nuances of the various tasks performed on social networks, some scholars have operationalized "usage" as numerous elementary activities (without any grouping) similar to those reported by Statista (2020a). For example, Pempek, Yermolayeva, and Calvert (2009) report 25 activities, and Junco (2012) lists 14 tasks.

The third approach groups these elementary actions in more consolidated but separated dimensions to deal with this excessive detail. For instance, Yang and Brown (2013) consider "electronic interactions," "voyeuristic use," "self-presentation," and "gaming;" while Lee et al. (2016) propose "self-disclosure," "social monitoring," "interpersonal communicating," and "information sharing." Under this view, the authors link each component directly to other constructs (antecedents or consequences). For example, Lee et al. (2016) consider each of their four dimensions as causes of "bonding social capital." <Appendix A> details prior studies that followed this approach.

To better understand the limitations of the previous approaches and the contribution of this study, it is necessary to review some key concepts. A multidimensional construct refers to several distinct but related dimensions treated as a single theoretical concept. This type of construct may be distinguished from the unidimensional construct, which refers to a single

theoretical concept (Edwards, 2001). For example, multidimensional overall job satisfaction comprises satisfaction with tasks, co-workers, supervisor, and payment. These more specific satisfaction dimensions are interrelated constructs that theoretically can be gathered under an overall concept called job satisfaction (Law et al., 1998).

In spite of the contribution of the abovementioned approaches, the literature can be extended in at least two ways. Firstly, it could be theoretically meaningful and parsimonious to use an overall abstraction to represent the diverse usage dimensions, similarly to the case of job satisfaction. Therefore, the pending task would be to conceptualize and evaluate a multidimensional model of SNS usage. Secondly, the third approach has derived dimensions primarily from factorial analysis or logged data without a previous theoretical discussion (e.g., Burke et al., 2011; Lee et al., 2016); consequently, prior dimensions are fragmented and dissimilar (Broughton et al., 2019). For example, some scholars mention more aggregated dimensions (e.g., Mäntymäki and Islam, 2016), while others propose more specific ones (e.g., Lee et al., 2016). Also, some authors consider communication as a dimension (e.g., Burke et al., 2011), while others ignore it (e.g., Yang and Brown, 2013). It is, therefore, necessary to derive the dimensions and synthesize them under an appropriate conceptual framework.

To address these gaps, this study aims to conceptualize and empirically validate a multidimensional "SNS usage" construct based on communication literature. In sum, this research proposes that "SNS usage" could be conceptualized as a multidimensional third-order construct that comprises "communicating," "producing," and "consuming" dimensions. Additionally, the "producing" dimension has three primary manifestations: "general information sharing," "self-disclosure of personal information," and "commenting" on others' posts.

At this point, the reader might wonder specifically why a third-order construct is needed and how it would contribute to the literature. First, despite the greater complexity of multidimensional construct measurement models, these constructs offer opportunities for advancing SNS research by capturing complex concepts in comparatively simple abstractions (Edwards, 2001; Polites et al., 2012). For example, Hu et al. (2015) proposed "online social value" as a third-order construct composed of four second-order dimensions ("utilitarian benefits," "hedonic benefits," "information risk," and "effort"), and four first-order dimensions ("relational benefits," "informational benefits," "enjoyment," and "curiosity fulfillment").

Second, advocates of multidimensional constructs argue that such constructs allow researchers to match broad predictors with broad outcomes and increase explained variance. These supporters have argued that such constructs are more theoretically functional than their dimensions. This argument stipulates that theories should be general, and those general theories require general constructs that combine specific dimensions (Edwards, 2001). Using a previous example, Hu et al. (2015) theorized and evaluated the influence of the higher-order construct "online social value" on "SNS satisfaction," rather than the impact of its numerous dimensions. Their model showed a more parsimonious causal chain. However, Edwards (2001) also states that this contention does not impede positing causal chains using the separate dimensions, but care must be taken with the level of abstraction of both sides of the relationship. In this regard, Edwards (2001, p. 149) noted, "multidimensional constructs have been recommended for matching general predictors with general outcomes. For example, researchers have asserted that many important out-

comes in organizational behavior research (e.g., job performance) are factorially complex and therefore require predictors that are also factorially complex." Moreover, Wong et al. (2008) illustrate that causal chains specified with multidimensional constructs instead of their separate dimensions could lead to different results and conclusions.

Third, a poor conceptualization of the construct has severe consequences for the validity of the research, and this conceptualization comprises a discussion about its dimensionality (MacKenzie, 2003). As MacKenzie et al. (2011, p. 300) pointed out, "Once the construct has been carefully defined, it is important to step back and evaluate whether there are multiple sub-dimensions of the focal construct and how they relate to the focal construct and to each other." Even more, the way a measurement model is operationalized (i.e., if it is formative or reflective, second-order or third-order) may influence the results of research models incorporating multidimensional constructs (Vlachos and Theotokis, 2009). In this regard, Polites et al. (2012, p. 23) note that "it is important to carefully conceptualize the relationship from not only the first-order dimensions and their indicators, but also from lower-order dimensions to the higher-order construct." This task is still pending for the "SNS usage" construct.

The rest of the work is organized as follows. First, theoretical development is presented, then the method is detailed and empirical results are shown. Finally, the authors conclude with the implications, limitations, and future research opportunities.

Ⅱ. Theoretical Development

"SNS usage" is defined as the extent that a user utilizes these platforms to carry out activities in a virtual network (Sun and Teng, 2012). For MacKenzie et al. (2011), once the construct under study has been demarcated, it is essential to define: 1) whether there are multiple dimensions of the focal construct and 2) how they are related to the pivotal construct and to each other. In addition, to subsequently establish nomological validity, it is necessary to specify antecedents and consequences of the focal construct. The rest of the section tackles these three issues.

2.1. Communication Activities as a Foundation to Elicit Usage Dimensions

Social networks are communication media, intermediaries between producers and consumers of content, information, and conversations (Bruns, 2015). Therefore, it is reasonable to approach SNS usage by exploring users' activities related to the production and consumption of content (Broughton et al., 2019; Mingers and Willcocks, 2017). Two theoretical abstractions are particularly useful in outlining the different dimensions of SNS usage. First, in a basic communication scheme, a producer or individual initiates or broadcasts messages received and interpreted by one or more consumers through some medium (e.g., Facebook, Twitter) (Mingers and Willcocks, 2017). Unlike traditional media, where the roles of producers (e.g., TV station) and consumers (viewers) are clearly distinguished, in the case of social media, users can have both roles and therefore develop both activities (Bond et al., 2021; Yamamoto et al., 2020). In SNS, there is also a distinction between private and public communication. In private communications, the message is sent to a particular person and is essentially bidirectional (e.g., chatting or messaging). In public communication, the message is directed to a broad audience (e.g., posting a photo), and the consumption occurs without necessarily eliciting an active response

from the receiver (e.g., passive browsing of posts) (Burke and Kraut, 2016; Wenninger et al., 2019). <Table 1> summarizes the dimensions of use derived from these taxonomies. The "communication" dimension reflects the specific interaction of two users using SNS platforms. In the public communication realm, the "production" dimension represents the emission of messages towards a broad audience, and the "consumption" dimension captures the reception of messages that have not had a specific target audience.

Secondly, the type of information broadcast on the social network can fine-tune the production activities. Some data tend to be more personal or autobiographical, while others are more public or collective (Stone and Wang, 2019). The SNS literature has also differentiated between behaviors that reveal personal information from those which convey public information, and a notorious difference in privacy concerns between both conducts has been documented (Ranzini et al., 2020). Therefore, the "production" dimension can be disaggregated into three sub-dimensions according to the type of information broadcast. The emission of messages about the personal sphere leads to "self-disclosure" and "commenting" sub-dimensions, while the "general sharing" sub-dimension is broadcasting messages about public content or generic information.

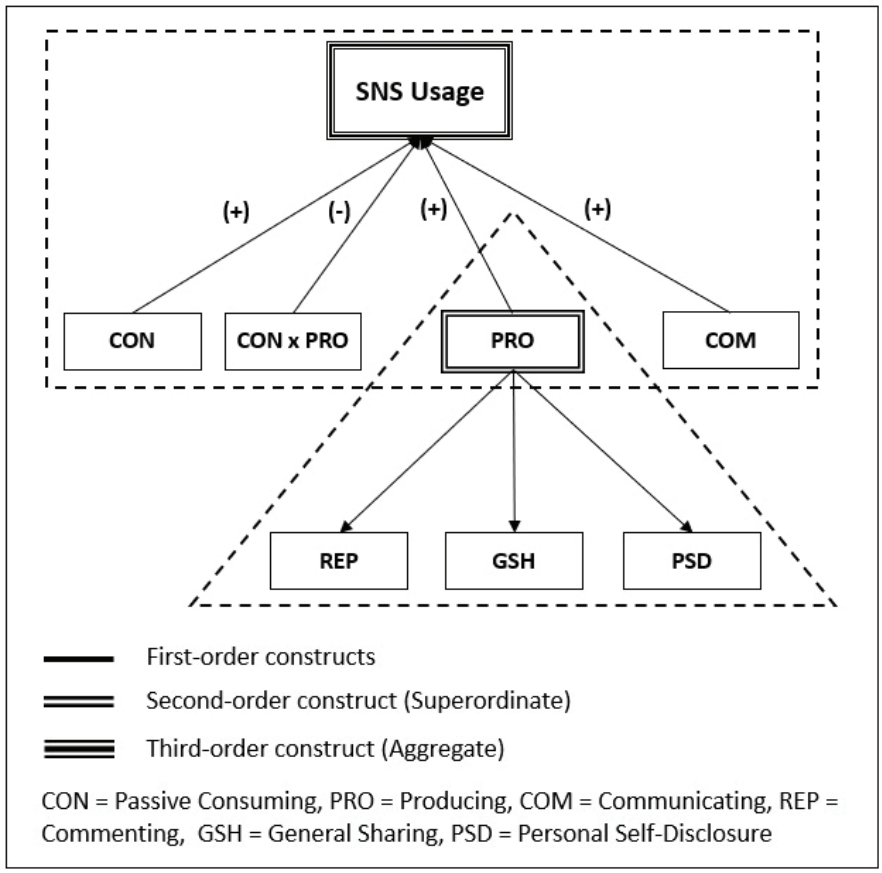
The present study gives a conceptual order to the fragmented and dispersed dimensions existing in previous literature and, at the same time, is consistent with the previously proposed categories, as can be seen in the last column of <Table 1>.

2.2. Multidimensional Structure of Usage

According to MacKenzie et al. (2011), once the dimensions of use have been derived, it is necessary to configure the multidimensional structure discussing how they are related to the usage construct and to each other. <Figure 1> summarizes this structure, where "SNS usage" stands as a third-order variable.

<Table 1> SNS Usage Dimensions

Dimension	Definition	Sources
1. Communicating	Bidirectional (private) communication between two users through a SNS platform (e.g, chatting or messaging)	Burke et al. (2011); Burke and Kraut (2016); Lee et al. (2016); Yang and Brown (2013)
2. Consuming	One-way communication through a SNS platform, which considers the passive reception of non-targeted messages (e.g, checking people's walls or news feed)	Broughton et al. (2019); Burke et al. (2011); Burke and Kraut (2016); Lee et al. (2016); Mäntymäki and Islam (2016); Yang and Brown (2013)
3. Producing	One-way communication through a SNS platform considering the emission of non-targeted messages	Broughton et al. (2019); Chang (2015); C. Kim and Shen (2020); Mäntymäki and Islam (2016)
3.1 Commenting	The degree of commenting on the network's posts on a SNS platform	Burke et al. (2011); C. Kim and Yang (2017); Yang and Brown (2013)
3.2 Self-disclosure	The degree of exposing personal information or feelings on a SNS platform	Lee et al. (2016); Yang and Brown (2013); Yu et al. (2015)
3.3 General sharing	The degree of broadcasting or posting about general topics on a SNS platform	Burke et al. (2011); C. Kim and Yang (2017); Lee et al. (2016)



<Figure 1> Multidimensional Structure of SNS Usage

2.2.1. How Dimensions are Related to SNS Usage (Third-order Construct)

Literature differentiates between superordinate and aggregate multidimensional constructs. A superordinate construct represents an overall concept (higher-order construct) that underlies its dimensions (lower-order constructs), and each of them shows a different manifestation of the high-order construct (Edwards, 2001). In this case, the relationship flows from the higher-order construct to its dimensions (Polites et al., 2012). Accordingly, if the high-order construct increases, all the dimensions will increase, meaning the dimensions should be highly correlated (Law et al., 1998; Polites et al., 2012). For example, the high-order construct "general privacy concerns" manifests itself through three sub-concerns about 1) websites' data collection methods, 2) websites' information privacy practices, and 3) the loss of control over personal information (Malhotra et al., 2004). So, if a user's "general privacy concerns" increases, the three proposed dimensions will also rise since the latter are manifestations of the former.

Conversely, an aggregate construct is a composite of its dimensions (lower-order constructs), i.e., the dimensions combine algebraically to produce this type of construct (Edwards, 2001). In this case, the relationship flows from the lower-order constructs to

the higher-order construct (Polites et al., 2012). Consequently, a change in any single dimension does not necessarily imply a change in the other dimensions, and the dimensions do not have to correlate with each other (Becker et al., 2012; Polites et al., 2012). Law et al. (1998) explained this type of construct using the concept of "motivating potential" of a job, which is formed by: skill variety, task autonomy, task significance, task identity, and the amount of feedback. They noted that although it is a legitimate argument that these five dimensions form an overall representation of how motivating a job is, it makes no sense to argue that there exists a superordinate construct called "motivating potential" that can be manifested solely as, for example, task autonomy or task significance. Therefore, the construct of "motivating potential" should logically be defined under the aggregate instead of the superordinate model.

Following the reasoning of Law et al. (1998), this study contends that "SNS usage" can be conceived as an aggregate construct consisting of "consuming," "producing," and "communicating," because these dimensions are defined as complementary characteristics of SNS usage rather than manifestations of an underlying superordinate construct that could cause them. Each dimension is a defined characteristic of "SNS usage" because they do not all share the same theme or type of interaction: in "producing," messages flow from the user to the network; in "consuming," messages flow in the opposite direction; and in "communicating," messages flow in both directions. Deleting one of these dimensions would notably change the domain of "SNS usage" (Barki et al., 2007; Burke et al., 2011). These dimensions are complementary because the sum of user interaction with each dimension should form the total interaction with the SNS (Burke et al., 2011; Mäntymäki and Islam, 2016). It is reasonable to expect that if a user increases their "producing" dimension, their overall "SNS usage" will increase as well. However, this change does not imply that the other two dimensions will increase; they might even decrease. Thus, the existence of a superordinate construct behind these dimensions is unlikely (Barki et al., 2007; Johnson et al., 2012)

2.2.2. How Dimensions Combine to Form SNS Usage

For aggregate constructs, it is necessary to define the mathematical function that expresses the relationship between usage and its dimensions. Aggregation may be additive, multiplicative, or a more complex algebraic formula (Polites et al., 2012). This study contends that "SNS usage" is an additive function of "communicating," "producing," and "consuming" plus a negative multiplicative function of "producing" by "consuming." The complementary nature of the three abovementioned dimensions positions them as additive components in the equation to explain "SNS usage." Furthermore, following the reasoning of Goo et al. (2015) about the competition for scarce resources in a usage context, in this study "consuming" and "producing" activities compete for limited user time. Users have a specific budget of time to use the SNS and assign quotas for each one of their activities in these platforms. The more time spent on one activity, the less time assigned to the other. This tradeoff results in a negative multiplicative function in the equation. Some empirical results are in line with this contention (Ghose and Han, 2011).

2.2.3. How Sub-dimensions are Related to Producing (Second-order Construct)

This study contends that "producing" is a superordinate construct underlying the sub-dimensions:

"commenting," "general sharing," and "personal self-disclosure." "Producing" can be viewed as a general concept representing the interaction between users and the network, and the sub-dimensions are simply different manifestations of this one-way communication (Polites et al., 2012; Yang and Brown, 2013; Yu et al., 2015). Indeed, users' production is varied, with users engaging with a SNS mostly to comment and share general information and less to disclose personal information (Lee et al., 2016). Although there may be differences in the type of information delivered and the frequency of these activities, a user with a producing-oriented posture will (to some extent) exhibit all the three sub-dimensions. In other words, these sub-dimensions will co-vary (Polites et al., 2012; Yang and Brown, 2013). Finally, it is expected that if users reduce their tendency toward producing content, they will decrease the level of the three sub-dimensions instead of lowering only one. Thus, configuring "producing" as a superordinate construct is more plausible (Polites et al., 2012).

2.3. How the Focal Construct Relates to Others

To assess the nomological validity of "SNS usage," prior studies proposed three antecedents ("social technology fit," "trust," and "strength of social ties") and one consequence ("benefits") of the focal construct (Sarstedt et al., 2019). According to the Task-Technology-Fit Model (TTF) (Goodhue et al., 1995) it is expected that "social technology fit" (i.e., the correspondence between social activities and the functionality of SNSs) impacts the use of these platforms (Bravo and Bayona, 2020; Lu and Yang, 2014).

Likewise, trust in SNSs refers to users' expectations that the platform will act predictably, fulfilling its obligations, and acting appropriately (Kourouthanassis et al., 2015). Following Social Capital Theory (SCT) (Nahapiet and Ghoshal, 1998), individuals will use a SNS as long as they consider that the platform's attributes are trustworthy (Lankton and McKnight, 2011). Also, the "strength of social ties" can influence the use of SNSs given that as these links become stronger, the more motivated individuals will be to use these platforms to maintain and develop their social network (Lee et al., 2016; Lin and Lu, 2011). As for the consequences of "SNS usage," the TTF model also proposes that the use of these platforms positively affects "benefits" (Lee and Lee, 2020).

Ⅲ. Research Methodology

3.1. Measurement of Variables

According to Straub et al. (2004), measurement instruments from existing literature were adapted to improve content validity. <Appendix B> shows the sources and the measurement items. All first-order variables were reflective, as suggested by prior research. The second and third-order variables were measured as reflective and formative, respectively, as the theoretical framework conceptualizes.

Before collecting the full-scale sample, a pilot test was conducting, gathering 74 preliminary observations. With this sample, the present study evaluated the reliability and validity of the measurement model. Almost all the results were in acceptable ranges suggested by previous research (Hair et al., 2011). Hence, only minor changes were performed prior for the full-sample collection.

3.2. Data Collection and Analysis

For the survey, the sample was made up of Facebook

users. Three criteria were used to choose Facebook for the present study: 1) current number of active users, 2) growth rate of active users, and 3) allowed activities on the platform. As regards the first criterion, Facebook is leading the ranking of SNSs with 2.91 billion active users, followed by YouTube (2.56 billion active users) and WhatsApp (2.0 billion active users) (Statista, 2022). The second criterion also places Facebook at the top of the list with the fastest-growing rate of monthly active users, followed also by YouTube and WhatsApp (Datareportal, 2022a). In terms of the third criterion, Facebook is a SNS where all the activities discussed in the Theoretical Framework section (i.e., "producing," "consuming," and "communicating") can be observed. On the YouTube platform, in contrast, most of the users' activities are based on consuming content such as watching videos (90.24%), listening to music (77.03%), and watching tutorials (61.62%), with low levels of producing content: commenting on videos (18.48%) or uploading videos (13.45%) (Statista, 2019). YouTube does not even have the possibility of "communicating" privately with other users. For its part, WhatsApp is a platform that mostly allows the "communicating" dimension, by permitting users to send text messages, voice messages, and videocalls to a specific user or group of users. However, the other dimensions of our theoretical construct are not exploited.

Amazon Mechanical Turk was used to collect data from adult Facebook users in the USA. They were informed that their participation was voluntary and that their answers would remain anonymous. This study followed three methods to detect careless responses: 1) inclusion of attention check items, 2) distribution of the items for the direct measure of use frequency throughout the survey (then the responses to these items were checked for consistency), and 3) inclusion of a statement informing the participants that a statistical method is in place to detect careless responses.

A monetary incentive for each valid and completed response was given, comparable to payments for similar tasks on this website. After excluding careless responses, a total of 414 valid observations were used for analysis. Following the recommendation of Cohen (1992) on sample size, it would be necessary to have a minimum of 69 observations to detect an R^2 value of at least 0.25 to achieve a statistical power of 0.8 at a significance level of 0.01 (Hair et al., 2010). This sample size met this requirement.

The structural equation modeling (SEM) technique was used because it allows the inclusion of multiple measures for each variable, providing more accurate estimations for the paths among variables. Among SEM options, the partial least squares (PLS) variance-based technique was chosen to fit the exploratory nature of the present study (Hair et al., 2011). Indeed, PLS serves "to constrain the new constructs and measures to its immediate nomological neighborhood of constructs and avoid possible CBSEM estimation bias that can be affected by minor modeling or item selection errors" (Chin, 2010, p. 660). In addition, the proposed model has formative constructs and higher-order constructs, situations in which PLS has been claimed to be more beneficial (Lowry and Gaskin, 2014). The used tool was SmartPLS 3.0 (Ringle et al., 2015), with a set of the bootstrapping algorithm in 5000 bootstrap samples, and the path weighting scheme in the case of higher-order constructs (Sarstedt et al., 2019).

3.3. Sample

The sample was composed of 50.48% males and 49.52% females. The range with the highest frequency for age distribution was from 31 to 35 years old.

Network size was almost uniformly distributed across its respective ranges. In the case of time spent on the SNS per day, around 80% of the respondents use it at most one hour. Finally, more than 82% of the respondents had held an account for at least 6 years. <Table 2> shows the demographic information.

<Table 2> Demographics

Participants (N = 414)		Frequency	Percent
Gender	Male	209	50.48%
	Female	205	49.52%
Age	21-25	9	2.17%
	26-30	68	16.43%
	31-35	107	25.85%
	36-40	79	19.08%
	41-45	44	10.63%
	46-50	35	8.45%
	51-55	32	7.73%
	56-60	20	4.83%
	More than 60 years old	20	4.83%
Network size	50 or less	56	13.53%
	51-100	62	14.98%
	101-150	61	14.73%
	151-200	42	10.14%
	201-300	73	17.63%
	301-400	43	10.39%
	401-600	27	6.52%
	More than 600	50	12.08%
Time spent per day	Less than 10min	84	20.29%
	20-30min	146	35.27%
	31-60min	100	24.15%
	2 hours	44	10.63%
	3 hours	16	3.86%
	4 hours	10	2.42%
	More than 4 hours	14	3.38%
SNS account	1 year or less	0	0.00%
	2 years	3	0.72%
	3 years	13	3.14%
	4 years	20	4.83%
	5 years	35	8.45%
	6 years or more	343	82.85%

Ⅳ. Results

This section validates the structure shown in <Figure 1>. First, multicollinearity and common method bias are evaluated. Then, the validation for the first, second, and third-order constructs are developed. Next, nomological validity is assessed. Finally, a mediation test is carried out.

4.1. Test for Multicollinearity and Common Method Bias

Multicollinearity was assessed through the variance inflation factor (VIF). According to literature, VIF values equal to or less than 5 indicate that a proposed construct does not present multicollinearity (Hair et al., 2011). In the proposed model, all VIF values were under this threshold. The highest VIF value was for "producing" as an antecedent to usage frequency (2.896). Hence, the model does not present evidence of multicollinearity.

In the case of common method bias (CMB), Harman's single-factor approach was used. For this test, an exploratory factor analysis was conducted in SPSS with all the measurement items. CMB is considered to be absent if the first unrotated extracted factor accounts for at most 50% of the data variance (Podsakoff and Organ, 1986). In the model, this percentage was 39.32%, which is under this suggested threshold. Therefore, CMB was unlikely to be a significant issue.

4.2. First-Order Measurement Validation

This validation included the analysis of reliability, and convergent and discriminant validity, considering that all first-order variables are reflective. Three criteria were used to assess the reliability and convergent validity of the proposed measurement model. First, each item's loading on its corresponding latent variable (reliability of items) was found to be larger than the threshold of 0.7 suggested by Barclay et al. (1995), as shown in <Appendix C>. In the case of the second criterion (internal consistency), the values of both Cronbach's alpha and composite reliability were evaluated. <Table 3> shows that both indicators associated with the data exceeded the recommended minimum value of 0.7 (Numally, 1978). As for the third criterion, this study analyzed the average variance extracted (AVE) of each latent variable. Hu et al.

<Table 3> Reliability and Convergent Validity

Latent Variable	Cronbach's Alpha	Composite Reliability	AVE
Communicating (COM)	0.852	0.931	0.871
Consuming (CON)	0.834	0.900	0.751
SNS Trust (SNT)	0.946	0.961	0.860
Social Technology Fit (FIT)	0.891	0.932	0.820
Use Frequency – Direct Measure (FQ_D)	0.935	0.951	0.794
General Benefits (GBF)	0.883	0.928	0.811
General Sharing (GSH)	0.936	0.951	0.795
Personal Self- Disclosure (PSD)	0.911	0.934	0.738
Commenting (REP)	0.912	0.938	0.792
Strength of Social Ties (SST)	0.854	0.912	0.775

<Table 4> Heterotrait-Monotrait Ratio (HTMT)

Variables	COM	CON	SNT	FIT	FQ_D	GBF	GSH	CON x PRO	PSD	REP	SST
COM											
CON	0.478										
SNT	0.360	0.334									
FIT	0.438	0.473	0.386								
FQ_D	0.614	0.654	0.521	0.603							
GBF	0.423	0.455	0.572	0.739	0.743						
GSH	0.589	0.585	0.488	0.433	0.576	0.484					
CON x PRO	0.244	0.220	0.196	0.083	0.081	0.071	0.519				
PSD	0.559	0.477	0.504	0.390	0.512	0.417	0.789	0.565			
REP	0.612	0.579	0.495	0.453	0.634	0.509	0.882	0.478	0.786		
SST	0.370	0.283	0.411	0.606	0.391	0.497	0.386	0.125	0.383	0.447	

Note: COM: Communicating, CON: Consuming, SNT: Social Network Trust, FIT: Social Technology Fit, FQ: Use Frequency (Direct Measure), GBF: General Benefits, GSH: General Sharing, PSD: Personal Self-Disclosure, REP: Commenting, SST: Strength of Social Ties, PRO: Producing

(2004) suggested that AVE values should be at least 0.5. From an inspection of <Table 3>, the results met this criterion. In short, the measurement instrument presents adequate reliability and internal consistency.

To assess the discriminant validity of the measurement instrument, the criteria used were: 1) cross-loadings, 2) the heterotrait-monotrait ratio (HTMT), and 3) the Fornell-Lacker criterion. In the first of these, the literature posits that each item should load more strongly on its corresponding construct than on every other construct. These differences in loadings are known as cross-loadings. Straub et al. (2004) suggested that when PLS are used, these cross-loading differences should be at least 0.1. <Appendix C> shows that all cross-loading differences met this recommendation. As for the second criterion, Hultén (2007) claimed that adequate discriminant validity is supported by HTMT values that are lower than 0.85 if constructs are conceptually different. In the case of variables that are conceptually similar, HTMT values should be at most 0.90 (Hultén, 2007). From an inspection of <Table 4>, all HTMT values are under 0.85, except for the one associated with "commenting" (REP) and "general sharing" (GSH), which is 0.882. However, REP and GSH are conceptually related because they are the dimensions of a second-order superordinate (reflective) variable, and thus the 0.9 threshold should be considered. In the case of the third criterion, the square root of the AVEs should be larger than the cross-correlations (Chin, 1998). <Table 5> shows that the measurement model meets this criterion.

4.3. Second-Order Measurement Validation

The second-order variable "producing" is theorized as superordinate (reflective) and operationalized through a repeated-indicator approach. This configuration is known as a reflective-reflective hierarchical

<Table 5> Correlation Between Constructs and AVE

Variables	COM	CON	SNT	FIT	FQ_D	GBF	GSH	CON x PRO	PSD	REP	SST
COM	0.933										
CON	0.403	0.866									
SNT	0.326	0.299	0.927								
FIT	0.383	0.408	0.359	0.906							
FQ_D	0.550	0.578	0.494	0.550	0.891						
GBF	0.368	0.391	0.527	0.657	0.673	0.900					
GSH	0.525	0.517	0.462	0.395	0.541	0.440	0.892				
CON x PRO	0.225	0.200	0.192	0.078	0.067	0.068	0.502	1.000			
PSD	0.493	0.417	0.470	0.353	0.477	0.377	0.730	0.539	0.859		
REP	0.540	0.505	0.462	0.409	0.589	0.458	0.815	0.455	0.716	0.890	
SST	0.321	0.241	0.376	0.529	0.349	0.432	0.349	0.117	0.340	0.396	0.880

Note: COM: Communicating, CON: Consuming, SNT: Social Network Trust, FIT: Social Technology Fit, FQ_D: Use Frequency (Direct Measure), GBF: General Benefits, GSH: General Sharing, PSD: Personal Self-Disclosure, REP: Commenting, SST: Strength of Social Ties, PRO: Producing Numbers on the diagonal are the square root of AVE values

component model (HCM), and according to Becker et al. (2012), the repeated indicators in "producing" should be reflective as well (Mode A). Accordingly, both reliability and convergent validity were assessed. First, the paths going from the second-order variable to the first-order variables represent the associated loadings. Hence, each of these paths (loadings) should be significant and equal to or higher than 0.7 (Barclay et al., 1995). Second, with these paths (loadings for the second-order construct) the Cronbach's alpha and composite reliability of this higher-order variable were assessed by applying the formulas displayed in <Appendix D>. According to the literature, these values should be at least 0.7 (Numally, 1978). Third, using these paths, the AVE value for this construct, which should be at least 0.5 (Hu et al., 2004), was estimated (see <Appendix D> for the formula). As shown in <Table 6>, the proposed second-order variable met all these criteria, supporting its reliability and validity.

In addition, this study used the HTMT value. (See <Appendix D> for the required formula and example of calculation.) All HTMT values for "producing" were lower than the threshold of 0.85, which supports the discriminant validity of this variable (Hultén, 2007). These values were: HTMT (producing, communicating) = 0.588, HTMT (producing, consuming) = 0.534, HTMT (producing, SNS Trust) = 0.504, HTMT (producing, social technology fit) = 0.426, HTMT (producing, general benefits) = 0.469, and HTMT (producing, strength of social ties) = 0.399.

<Table 6> Second-order Variable Reliability and Validity

Relationship	Path (Loading)	CR / AVE
PRO → REP	0.916***	Cronbach's alpha = 0.902 CR = 0.938 AVE = 0.836
PRO → GSH	0.936***	
PRO → PSD	0.890***	

Note: PRO: Producing, REP: Commenting, GSH: General Sharing, PSD: Personal Self-Disclosure, CR: Composite Reliability, *** $p < 0.001$

4.4. Third-Order Measurement Validation

In the case of the proposed third-order variable (SNS usage), this construct is theorized as formative and operationalized using the repeated-indicator procedure. This HCM type is known as reflective-formative, having the repeated indicators in "SNS usage" modelled as formative (Mode B), as suggested by Becker et al. (2012). For formative latent variables, it is necessary to analyze whether multicollinearity exists among its components. The absence of multicollinearity should isolate the contribution from each component (Diamantopoulos and Winklhofer, 2001). As described in the previous section, multicollinearity was assessed through VIF values among the four components, which ranged from 1.500 to 2.896[1]. These values are below the suggested threshold of 5 (Hair et al., 2011). Hence, multicollinearity is not a problem to assess this formative higher-order construct. Then, the paths going from the four components to "SNS usage" were analyzed. These paths represent the weights of the components; therefore, they should be significant (MacKenzie et al., 2011). <Table 7> shows that the proposed model met this criterion. Also, the four components explained 98.3% of the variance in "SNS usage," with "producing" (PRO) being the strongest component, followed by "consuming" (CON), "communicating" (COM), and the interaction between PRO and CON.

<Table 7> Weights of the Components of SNS Usage

Components of use frequency (Repeated indicator)	Path (Weight)	R^2
Communicating (COM)	0.311***	0.983
Consuming (CON)	0.411***	
Producing (PRO)	0.559***	
Interaction CON x PRO	-0.147***	

Note: *** $p < 0.001$

To ensure convergent validity, a direct measure of SNS usage—use frequency with five reflective items (see <Appendix B>)—was utilized. Content validity exists if the repeated-indicator measure of the higher-order construct significantly correlates with its direct measure (Pavlou and Fygenson, 2006). The results show that the correlation coefficient among the repeated-indicator and the direct measure of this variable was 0.750 and significant at 0.001 level. By further analyzing this value, this path produces a lower boundary of 0.719 and an upper boundary of 0.791 for the 95% percentile confidence interval. This result supports the convergent validity of this construct, because the path is higher than the threshold of 0.7 (Hair et al., 2017). Finally, the validity of the set of components was assessed through the adequacy coefficient (R^2a). According to MacKenzie et al. (2011), R^2a "is calculated by summing the squared correlations between the construct and its dimensions [⋯] and dividing by the number of dimensions." <Table 8> shows that the associated R^2a of the proposed model is in the suggested range of at least 0.5 (MacKenzie et al., 2011). In summary, "SNS usage" presents adequate validity.

<Table 8> Adequacy Coefficient for SNS Usage

Components of SNS usage (Repeated indicator)	Correlation with SNS usage	Adequacy coefficient (R^2_a)
Communicating (COM)	0.751	0.64 (without the interaction effect) 0.50 (with the interaction effect)
Consuming (CON)	0.792	
Producing (PRO)	0.848	
Interaction CON x PRO	0.267	

4.5. Nomological Validity

Nomological validity refers to the extent to which a construct is related to other relevant constructs.

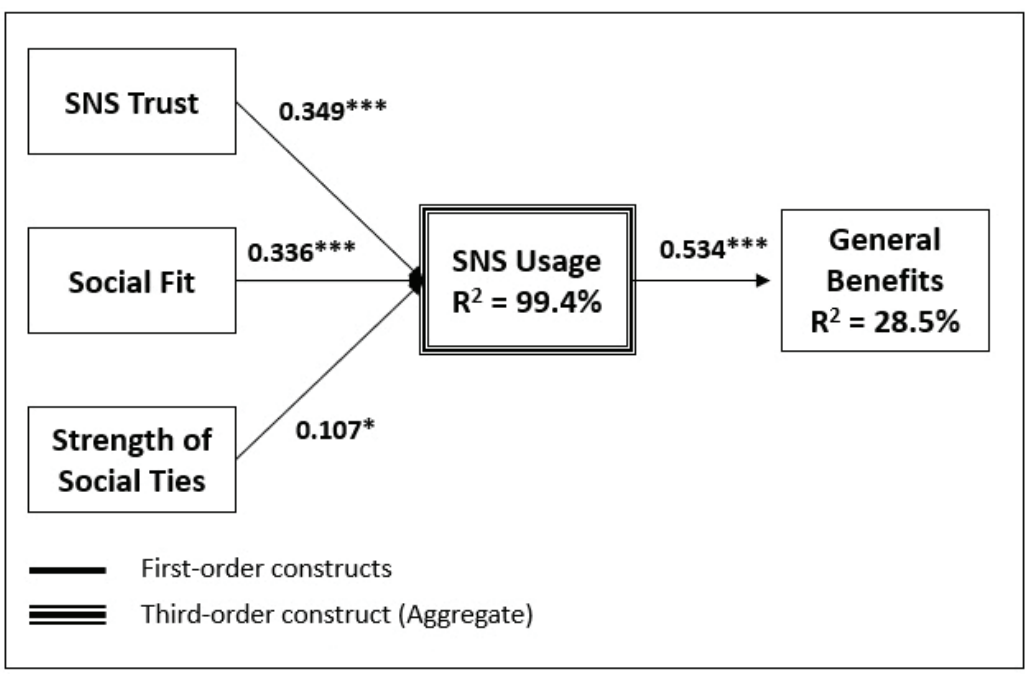
SNS usage has been hypothesized to have antecedents and consequences. In the case of its antecedents, as described in the theoretical development section, prior literature suggests that "SNS trust" (SNT), "social technology fit" (FIT), and "strength of social ties" (SST) have a positive effect on "SNS usage." In terms of its consequences, the previous section posits that "SNS usage" leads to benefits associated with the use of these platforms, which was operationalized through "general benefits" (GBF). <Figure 2> shows the proposed structural model to assess the nomological validity of the theorized construct.

Considering that "SNS usage" is an aggregate higher-order construct, the associated total effects were used to assess the impact of its antecedents. The results support a significant positive effect of SNT ($\beta = 0.349$, $p < 0.001$), FIT ($\beta = 0.336$, $p < 0.001$), and SST ($\beta = 0.107$, $p < 0.05$) on "SNS usage" with an R^2 value of 99.4%. However, this value (R2) should not be interpreted because "SNS usage" is a formative variable (i.e., the dimensions of this construct account for almost all its variance). Furthermore, the impact of SNS usage on its consequence such as "general benefits" was found to be significant ($\beta = 0.534$, $p < 0.001$), accounting for 28.5% of its variance.

The above results support the nomological validity of "SNS usage" as a higher-order formative construct.

4.6. Mediation Test

Considering that "SNS usage" is a formative higher-order variable, it is expected that this construct mediates the impact of its underlying formative factors on "general benefits." To assess this mediation, this research followed the guidelines proposed by Zhao et al. (2010). However, mediation was conducted using the direct measure of "SNS usage" (i.e., use frequency) to avoid multicollinearity problems in the calculation



<Figure 2> Results of the Proposed Nomological Network of SNS Usage

<Table 9> Mediation Analysis

Relationship	Direct effect	Indirect effect	Mediation
CON → GBF	-0.032^{ns}	0.218***	Full
PRO → GBF	0.131**	0.163***	Partial
COM → GBF	-0.047^{ns}	0.173***	Full

Note: COM: Communicating, CON: Consuming, GBF: General Benefits, PRO: Producing, ns: non-significant, ** p < 0.01, *** p < 0.001

of the effects considering that the repeated-indicator measure represented extremely high VIF values. <Table 9> shows these results. Full mediation was confirmed in the case of "consuming" and "communicating." For its part, "producing" presents a partial mediation. Overall, results support the higher-order nature of "SNS usage."

Ⅴ. Discussion and Implications

Our study develops and empirically assesses a multidimensional structure of "SNS usage." This work, grounded in communication and SNS literature, conceived "SNS usage" as a third-order construct formed by three constructs: "communicating," "producing," and "consuming" activities. In turn, "producing" is conceptualized as a second-order construct manifested by "general sharing," "self-disclosure," and "commenting" activities. The results empirically show the consistency and validity of this structure, deepening our understanding of this behavior.

5.1. Theoretical Implications

The present findings contribute to the information systems (IS) literature. First, this research proposes a broader conceptualization of "SNS usage" than the traditional and predominant unidimensional view operationalized as a global frequency of use. The proposed conceptualization describes "SNS usage" from the users' perspective and theorizes it as a function of various activities that users perform in these platforms to achieve their goals (e.g., relational, informational). This approach is aligned with other authors who claimed the need to conceptualize technology usage from a user-activities perspective (Barki et al., 2007; Sun and Teng, 2012). There are a number of ways in which researchers can take advantage of this activity-based categorization. For example, the proposed usage dimensions demarcate and clarify the content of these platforms; thus, researchers have a deeper understanding of "SNS usage" for their particular studies, with a detailed and validated measurement instrument of this construct's dimensions that can be applied in future research. In addition, this type of conceptualization, which includes the individual and their tasks, has shown empirically greater explanatory power than unidimensional conceptualizations (Burton-Jones and Straub Jr, 2006; Lallmahomed et al., 2013). In short, the present results provide researchers with more powerful theories to advance in this field.

Second, although previous literature had already grouped activities into several first-order constructs, they were dispersed and not integrated. The merit of the present study is: 1) to derive the dimensions theoretically, 2) to match these dimensions with those existing in the SNS literature, and 3) to define the multidimensional architecture that integrates them. On this last point, MacKenzie et al. (2011, p. 302) point out that "an essential part of a construct's con-

ceptualization is the specification of how the sub-dimensions combine to give the construct its meaning." Likewise, Law et al. (1998, p. 741) claim that "a necessary condition for a multidimensional construct to be well defined is that the relations between the overall construct and its dimensions must be specified."

Third, future IS research may also benefit from this holistic representation. Prior research claims that a holistic conceptualization of complex phenomena may help researchers develop more parsimonious and realistic explanations of these occurrences (Edwards, 2001; Law et al., 1998; Polites et al., 2012). In addition, with a holistic representation, researchers could match broad predictors with overall outcomes, which is aligned with theory suggesting that it is better to have constructs at the same level of abstraction when assessing cause-effect relationships (Edwards, 2001; Polites et al., 2012). In other words, multidimensional outcomes should be related to multidimensional predictors. For example, Hsu and Lin (2017) evaluate the impact of "cognitive absorption" (conceived as multidimensional) on "usage" (defined as unidimensional). Likewise, Hu et al. (2015) relate "online social value" (multidimensional) to "usage" (unidimensional). Following Edwards (2001), the multidimensional "usage" construct proposed in the present study can replace the unidimensional "usage" construct in those models so that predictor and outcome will be at the same level of abstraction, increasing the explained variance.

Finally, the present study shows in detail the procedure for assessing higher-order constructs of both aggregate and superordinate nature, which is uncommon in the literature. There are methodological articles (e.g., Becker et al., 2012) guiding for a general evaluation of complex multidimensional models; however, this study shows a step-by-step evaluation with a concrete, complex, and varied case. Also, some studies assess second or third-order aggregate or superordinate multidimensional models (e.g., Hu et al., 2015), but they do not address them simultaneously as the present study does. To that extent, this work may guide future researchers in evaluating the architecture of complex constructs using PLS-SEM.

5.2. Practical Implications

The present study also has practical implications. In order to appropriately design strategies to encourage the use of these networks, SNS providers require not only useful categories of use (dimensions) but also an understanding of how these relate to each other.

On the one hand, "producing," "consuming," and "communicating" contribute in aggregate to overall use, so each dimension obeys distinct causal chains, and their effects are largely independent of each other. According to Polites et al. (2012), the variance of the multidimensional aggregate construct will be the conjoint variance of all its dimensions. Thus, providers can design strategies that address the drivers of these three dimensions and will have mostly independent and cumulative effects on usage.

On the other hand, the sub-dimensions "commenting," "self-disclosure," and "general sharing" are manifestations of a latent construct behind them ("producing"); therefore, the causal chain that explains this last construct will impact the three sub-dimensions. SNS providers can thus design strategies that act on the factors that induce this latent construct and will obtain effects on each of its three most visible manifestations. It should be noted that each of the sub-dimensions could have other causes besides the latent construct.

In addition, SNS providers can also use the validated dimensions and architecture of "SNS usage" to better understand users and develop personalized marketing

strategies. For example, SNS can measure user activity on each dimension and learn about usage habits more granularly than a generic measure of use. These measures can be further analyzed with statistical models to derive relevant groups. Thus, managers can refine their marketing strategies based on these revealed clusters. Indeed, although it was omitted for brevity, we conducted a similar test that shows at least four emerging type of users. This potential use of this study's findings may also apply for those companies, institutions, or even individuals that are seeking to improve their marketing strategies over these platforms to provide more value to their customers, while improving their revenues.

Finally, SNS providers and sellers using these platforms at large can also improve their marketing strategies to the extent that they can relate specific usage dimensions to the various dimensions of benefits valued by users. In fact, the present study provides a taxonomy of usage that could be related, at a dimension level, to the categories of benefits proposed by Hu et al. (2015): informational, relational, curiosity, and enjoyment. It is possible to expect, for example, that "informational" and "curiosity" benefits have a stronger relationship with the "consuming" dimension than with the other usage dimensions. In that respect, managers can create new features that promote the recurring reception of messages by installing an algorithm for news that changes according to each user's pace, for example. This new feature can contribute to informational benefits and thus increase the overall use of SNS. A similar analysis can be performed for the other usage dimensions and associated benefits to improve decision-making.

5.3. Limitations and Future Studies

This study presents some limitations. First, the collected sample gathered information only from Facebook users; thus, further research can extend this analysis to other SNSs such as YouTube, Instagram, WhatsApp, and Twitter, which all have some different features than Facebook. By doing this comparison, future research can explore users' similarities and differences across platforms.

Second, our sample included only US-based respondents. Hence, future studies can further validate this study's results in other countries with different backgrounds and characteristics to improve the external validity of these findings.

Third, aligned with the suggested use of these findings in the Practical Implications subsection, we suggest that researchers extend the literature by assessing: 1) the impact of the antecedents of "SNS usage" on each of its dimensions; 2) the impact of each usage dimension on specific consequences such as informational, relational, curiosity, and enjoyment benefits; and 3) user typologies based on the proposed usage taxonomy. The results of these proposed future studies may contribute to improve and personalize strategies based on each user's activities.

Finally, this study used a simplified view of user's activities, considering that each activity embraces only one usage dimension or sub-dimension at a time. However, it is possible that users may conceive more complex or ambiguous activities that make it difficult to distinguish a single specific usage dimension or sub-dimension. For example, sharing general information but including one's own opinion may impact not only on the "general sharing" sub-dimension but also on the "commenting" one. Likewise, giving a "like" may be considered in the "commenting" sub-dimension as well as in the "consuming" dimension. Therefore, future studies should explore theoretically and methodologically how to incorporate these more complex cases.

1. When considering the third-order construct in isolation (i.e., in a model, with only its components), the analysis produces a highest VIF value of 2.388 for Producing.

<References>

[1] Aladwani, A. M. (2014). Gravitating towards Facebook (GoToFB): What it is? and how can it be measured? *Computers in Human Behavior*, *33*, 270-278. https://doi.org/10.1016/j.chb. 2014.01.005

[2] Almakrami, H. A. A. (2015). *Online Self-Disclosure Across Cultures: A Study of Facebook Use in Saudi Arabia and Australia*. Queensland University of Technology.

[3] Barclay, D. W., Higgins, C. A., and Thompson, R. (1995). The partial least squares approach to causal modeling: Personal computer adoption and use as illustration. *Technology Studies*, *2*, 285-309.

[4] Barki, H., Titah, R., and Boffo, C. (2007). Information system use‐related activity: An expanded behavioral conceptualization of individual-level information system use. *Information Systems Research*, *18*(2), 173-192. https://doi.org/10.1287/isre.1070. 0122

[5] Becker, J. M., Klein, K., and Wetzels, M. (2012). Hierarchical latent variable models in PLS-SEM: Guidelines for using reflective-formative type models. *Long Range Plann*, *45*(5-6), 359-394. https://doi. org/10. 1016/j.lrp.2012.10.001

[6] Bond, A. J., Widdop, P., Cockayne, D., and Parnell, D. (2021). Prosumption, networks and value during a global pandemic: Lockdown leisure and COVID-19. *Leisure Sciences*, *43*(1-2), 70-77. https://doi.org/ 10.1080/01490400. 2020.1773985

[7] Bravo, E., and Bayona, H. (2020). Explaining multidimensional Facebook benefits: A task-technology fit approach. *Proceedings of the 53rd Hawaii International Conference on System Sciences*. Retrieved from http://hdl.handle.net/10125/ 64289

[8] Broughton, A., Nieuwoudt, M., Daly, M., Le Roux, D. B., Marx, N. J., and Parry, D. A. (2019). An exploratory investigation of online and offline social behaviour among digital natives. *Proceedings of the South African Institute of Computer Scientists and Information Technologists*. https://doi.org/10.1145/ 3351108.3351146

[9] Bruns, A. (2015). Making sense of society through social media. *Social Media + Society*, *1*(1). https://doi.org/10.1177/2056305115578679

[10] Burke, M., and Kraut, R. E. (2016). The relationship between Facebook use and well-being depends on communication type and tie strength. *Journal of Computer-Mediated Communication*, *21*(4), 265-281. https://doi.org/10.1111/ jcc4.12162

[11] Burke, M., Kraut, R., and Marlow, C. (2011). Social capital on Facebook: Differentiating uses and users. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 571-580. http://doi.org/:10.1145/1978942. 1979023

[12] Burke, M., Marlow, C., and Lento, T. (2010). Social network activity and social well-being. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. http://doi.org/10.1145/ 1753326.1753613

[13] Burton-Jones, A., and Straub Jr, D. W. (2006). Reconceptualizing system usage: An approach and empirical test. *Information Systems Research*, *17*(3), 228-246. https://doi.org/10.1287/ isre.1060.0096

[14] Chang, C. (2015). Self-construal and Facebook activities: Exploring differences in social interaction orientation. *Computers in Human Behavior*, *53*, 91-101. https://doi.org/10.1016/j.chb.2015. 06.049

[15] Chang, C. W., and Heo, J. (2014). Visiting theories that predict college students' self-disclosure on Facebook. *Computers in Human Behavior*, *30*, 79-86. https://doi.org/ 10.1016/j.chb.2013.07.059

[16] Chin, W. W. (1998). The partial least squares approach to structural equation modeling. In G. A. Marcoulides (Ed.), *Modern Methods for Business*

Research (pp. 295-358). Lawrence Erlbaum.

[17] Chin, W. W. (2010). How to write up and report PLS analyses. In I. V. V. Esposito, W. W. Chin, J. Henseler, and H. Wang (Eds.), *Handbook of Partial Least Squares: Concepts, Methods and Applications in Marketing and Related Fields*. Springer.

[18] Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 155-159. http://doi.org/10.1037//0033-2909.112.1.155

[19] Datareportal. (2022a). Digital 2022: Global overview report, Retrieved from https://datareportal.com/reports/digital-2022-global-overview-report

[20] Datareportal. (2022b). Digital 2022: Instagram's surge continues, Retrieved from https://datareportal.com/reports/digital-2022-instagram-headlines

[21] Datareportal. (2022c). Digital 2022: The potential future of Facebook, Retrieved from https://datareportal.com/reports/digital-2022-future-of-facebook

[22] Datareportal. (2022d). Digital 2022: Tiktok's rapid rise continues, Retrieved from https://datareportal.com/reports/digital-2022-tiktok-headlines

[23] Datareportal. (2022e). Digital 2022: YouTube's ad reach passes 2.5 billion, Retrieved from https://datareportal.com/reports/digital-2022-youtube-headlines

[24] Diamantopoulos, A., and Winklhofer, H. M. (2001). Index construction with formative indicators: An alternative to scale development. *Journal of Marketing Research*, *38*(2), 269-277. https://doi.org/10.1509/jmkr.38.2.269.18845

[25] Edwards, J. R. (2001). Multidimensional constructs in organizational behavior research: An integrative analytical framework. *Organizational Research Methods*, *4*(2), 144-192. https://doi.org/10.1177/109442810142004

[26] Ellison, N. B., Steinfield, C., and Lampe, C. (2007). The benefits of Facebook "friends:" Social capital and college students' use of online social network sites. *Journal of Computer Mediated Communication*, *12*(4), 1143-1168. https://doi.org/10.1111/j.1083-6101.2007.00367.x

[27] Ghose, A., and Han, S. P. (2011). An empirical analysis of user content generation and usage behavior on the mobile Internet. *Management Science*, *57*(9), 1671-1691. https://doi.org/ 10.1287/mnsc.1110.1350

[28] Goodhue, D., Thompson, R. L., and US. (1995). Task-technology fit and individual performance. *MIS Quarterly*, *19*(2), 213-236. https://doi.org/10.2307/249689

[29] Goo, J., Huang, C. D., and Koo, C. (2015). Learning for healthy outcomes: Exploration and exploitation with electronic medical records. *Information & Management*, *52*(5), 550-562. https://doi.org/10.1016/j.im.2015.04.002

[30] Hair, J. F., Black, W. C., Babin, B. J., and Anderson, R. E. (2010). *Multivariate Data Analysis. Englewood Cliffs*. Prentice Hall.

[31] Hair, J. F., Hult, G. T. M., Ringle, C. M., and Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (2nd ed.). Sage.

[32] Hair, J. F., Ringle, C. M., and Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *The Journal of Marketing Theory and Practice*, *19*(2), 139-152. https://doi.org/10.2753/MTP1069 -6679190202

[33] Hsu, M. H., and Lin, H. C. (2017). An investigation of the impact of cognitive absorption on continued usage of social media in Taiwan: The perspectives of fit. *Behaviour & Information Technology*, *36*(8), 768-791. https://doi.org/10.1080/0144929X.2017.1288267

[34] Hultén, B. (2007). Customer segmentation: The concepts of trust, commitment and relationships. *Journal of Targeting*, *15*, 256-269. https://doi.org/10.1057/palgrave. jt.5750051

[35] Hu, T., Kettinger, W. J., and Poston, R. S. (2015). The effect of online social value on satisfaction and continued use of social media. *European Journal of Information Systems*, *24*(4), 391-410. http://doi.org/10.1057/ejis.2014. 22

[36] Hu, X., Lin, Z., Whinston, A. B., and Zhang, H. (2004). Hope or hype: On the viability of escrow services as trusted third parties in online auction environments. *Information Systems Research*, *15*(3),

236-249. http://doi.org/10.1287/isre. 1040.0027

[37] Johnson, R. E., Rosen, C. C., Djurdjevic, E., and Taing, M. U. (2012). Recommendations for improving the construct clarity of higher-order multidimensional constructs. *Human Resource Management Review*, *22*(2), 62-72. Retrieved from https://www.sciencedirect.com/science/article/abs/pii/S1053482211000532

[38] Junco, R. (2012). Too much face and not enough books: The relationship between multiple indices of Facebook use and academic performance. *Computers in Human Behavior*, *28*(1), 187-198. https://doi.org/10.1016/j.chb. 2011.08.026

[39] Kim, C., and Shen, C. (2020). Connecting activities on Social Network Sites and life satisfaction: A comparison of older and younger users. *Computers in Human Behavior*, *105*, 106222. https://doi.org/10.1016/j.chb.2019.106222

[40] Kim, C., and Yang, S. U. (2017). Like, comment, and share on Facebook: How each behavior differs from the other. *Public Relations Review*, *43*(2), 441-449. https://doi.org/10.1016/j.pubrev.2017.02.006

[41] Kim, J., Lee, C., and Elias, T. (2015). Factors affecting information sharing in social networking sites amongst university students. *Online Information Review*, *39*(3), 290-309. https://doi.org/10.1108/OIR-01-2015-0022

[42] Kourouthanassis, P., Lekakos, G., and Gerakis, V. (2015). Should I stay or should I go? The moderating effect of self-image congruity and trust on social networking continued use. *Behaviour & Information Technology*, *34*(2), 190-203. http://doi.org/10.1080/0144929X.2014.948489

[43] Lallmahomed, M. Z. I., Rahim, N. Z. A., Ibrahim, R., and Rahman, A. A. (2013). Predicting different conceptualizations of system use: Acceptance in hedonic volitional context (Facebook). *Computers in Human Behavior*, *29*(6), 2776-2787. https://doi.org/10.1016/j.chb. 2013.07.018

[44] Lankton, N. K., and McKnight, D. H. (2011). What does it mean to trust Facebook?: Examining technology and interpersonal trust beliefs. *ACM SIGMIS Database: The DATABASE for Advances in Information Systems*, *42*(2), 32-54. https://doi.org/10. 1145/1989098.1989101

[45] Law, K. S., Wong, C. S., and Mobley, W. M. (1998). Toward a taxonomy of multidimensional constructs. *Academy of Management Review*, *23*(4), 741-755. https://doi.org/10.2307/259060

[46] Lee, J. Y., Park, S., Na, E. Y., and Kim, E. (2016). A comparative study on the relationship between social networking site use and social capital among Australian and Korean youth. *Journal of Youth Studies*, *19*(9), 1164-1183. https://doi.org/10.1080/1367 6261.2016.1145637

[47] Lee, S. Y., and Lee, S. W. (2020). Social media use and job performance in the workplace: The effects of facebook and kakaotalk use on job performance in South Korea. *Sustainability*, *12*(10), 4052. https://doi.org/10.3390/su12104052

[48] Limayem, M., and Cheung, C. M. K. (2011). Predicting the continued use of Internet-based learning technologies: The role of habit. *Behaviour & Information Technology*, *30*(1), 91-99. https://doi.org/ 10.1080/0144929X.2010.490956

[49] Lin, K. Y., and Lu, H. P. (2011). Why people use social networking sites: An empirical study integrating network externalities and motivation theory. *Computers in Human Behavior*, *27*(3), 1152-1161. https://doi.org/10.1016/j.chb.2010.12.009

[50] Lowry, P. B., and Gaskin, J. (2014). Partial Least Squares (PLS) Structural Equation Modeling(SEM) for Building and Testing Behavioral Causal Theory:When to Choose It and How to Use It. *IEEE Transactions on Professional Communication*, *57*(2), 123-146. http://doi. org/10.1109/TPC.2014.2312452

[51] Lu, H. P., and Yang, Y. W. (2014). Toward an understanding of the behavioral intention to use a social networking site: An extension of task-technology fit to social-technology fit. *Computers in Human Behavior*, *34*, 323-332. https://doi.org/10.1016/j.chb.2013.10.020

[52] MacKenzie, S. B. (2003). The dangers of poor construct conceptualization. *Journal of the Academy*

of Marketing Science, *31*(3), 323-326. https://doi.org/10.1177/00920703 03031003011

[53] MacKenzie, S. B., Podsakoff, P. M., and Podsakoff, N. P. (2011). Construct measurement and validation procedures in MIS and behavioral research: Integrating new and existing techniques. *MIS Quarterly*, *35*(2), 293-334. https://doi.org/10.2307/ 23044045

[54] Malhotra, N. K., Kim, S. S., and Agarwal, J. (2004). Internet Users' Information Privacy Concerns (IUIPC): The Construct, the Scale, and a Causal Model. *Information Systems Research*, *15*(4), 336-355. https://doi.org/10.1287/isre.1040. 0032

[55] Ma, L., Sian Lee, C., and Hoe-Lian Goh, D. (2014). Understanding news sharing in social media: An explanation from the diffusion of innovations theory. *Online Information Review*, *38*(5), 598-615. https://doi.org/10.1108/OIR-10- 2013-0239

[56] Mäntymäki, M., and Islam, A. K. M. N. (2016). The Janus face of Facebook: Positive and negative sides of social networking site use. *Computers in Human Behavior*, *61*, 14-26. Retrieved from https://www.sciencedirect.com/science/article/abs/pi i/S0747563216301418

[57] Mingers, J., and Willcocks, L. (2017). An integrative semiotic methodology for IS research. *Information and Organization*, *27*(1), 17-36. Retrieved from https://www.sciencedirect.com/science/article/abs/ pii/S1471772716300306

[58] Nahapiet, J., and Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, *23*(2), 242-266. https://doi.org/10.5465/ amr.1998.533225

[59] Numally, J. C. (1978). *Psychometric Theory*. McGraw-Hill.

[60] O'Leary, D., and Volkmer, S. A. (2021). Are the negative effects of social networking a privilege of the rich? Social network usage and life satisfaction across European countries. *Computers in Human Behavior Reports*, *3*, 100078. https://doi.org/10.1016/ j.chbr.2021.100078

[60] Park, J. H. (2014). The effects of personalization on user continuance in social networking sites. *Information Processing & Management*, *50*(3), 462-475. https://doi. org/10.1016/j.ipm.2014.02.002

[61] Partridge, K., and Begole, B. (2011). Activity-based advertising. In *Pervasive Advertising: Human-Computer Interaction Series* (J. Müller,). Springer.

[62] Pavlou, P. A., and Fygenson, M. (2006). Understanding and Predicting Electronic Commerce Adoption: An Extension of the Theory of Planned Behavior. *Management Information Systems Research Center, 30*(1), 115-143. http://doi.org/10.2307/25148720

[63] Pempek, T. A., Yermolayeva, Y. A., and Calvert, S. L. (2009). College students' social networking experiences on Facebook. *Journal of Applied Developmental Psychology*, *30*(3), 227-238. https://doi.org/10.1016/j.appdev.2008.12.010

[64] Podsakoff, P. M., and Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, *12*(4), 531-544. https://doi.org/10.1177/0149206 38601200408

[65] Polites, G. L., Roberts, N., and Thatcher, J. (2012). Conceptualizing models using multidimensional constructs: a review and guidelines for their use. *European Journal of Information Systems*, *21*(1), 22-48. https://doi.org/10.1057/ejis. 2011.10

[66] Ranzini, G., Newlands, G., and Lutz, C. (2020). Sharenting, peer influence, and privacy concerns: A study on the Instagram-sharing behaviors of parents in the United Kingdom. *Social Media + Society*, *6*(4), 1-13. https://doi.org/10.1177/20563 05120978376

[67] Rauniar, R., Rawski, G., Yang, J., and Johnson, B. (2014). Technology acceptance model (TAM) and social media usage: an empirical study on Facebook. *Journal of Enterprise Information Management*, *27*(1), 6-30. https://doi.org/10.1108/JEIM-04-2012-0011

[68] Ringle, C. M., Wende, S., and Becker, J. M. (2015). SmartPLS 3. Bönningstedt: SmartPLS, Retrieved from http://www. smartpls.com

[69] Sarstedt, M., Hair Jr, J. F., Cheah, J. H., Becker, J. M., and Ringle, C. M. (2019). How to specify,

estimate, and validate higher-order constructs in PLS-SEM. *Australasian Marketing Journal (AMJ)*, *27*(3), 197-211. https://doi.org/10.1016/j.ausmj.2019.05.003

[70] Statista. (2019). Main activities carried out by YouTube users in Mexico as of June 2019, Retrieved from https://www.statista.com/statistics/1071648/main-activities-carried-out-by-youtube-users/

[71] Statista. (2020a). Most popular Facebook activities in the United States as of March 2020, Retrieved from https://www.statista.com/statistics/275788/share-of-facebook-user-activities/

[72] Statista. (2020b). Number of social network users worldwide from 2017 to 2025 (in billions), Retrieved from https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/

[73] Statista. (2022). Most popular social networks worldwide as of October 2020, ranked by number of active users (in millions), Retrieved from https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/

[74] Stone, C. B., and Wang, Q. (2019). From conversations to digital communication: The mnemonic consequences of consuming and producing information via social media. *Topics in Cognitive Science*, *11*(4), 774-793. https://doi.org/10.1111/tops.12369

[75] Straub, D. W., Boudreau, M. C., and Gefen, D. (2004). Validation Guidelines for IS Positivist Research. *Communications of the AIS*, *13*, 380-427. https://doi.org/10.17705/ 1CAIS.01324

[76] Sun, J., and Teng, J. T. C. (2012). Information Systems Use: Construct conceptualization and scale development. *Computers in Human Behavior*, *28*(5), 1564-1574. https://doi.org/10.1016/j.chb.2012.03.016

[77] Vlachos, P. A., and Theotokis, A. (2009). Formative versus reflective measurement for multidimensional constructs. http://dx.doi. org/10.2139/ssrn.1521095

[78] Wenninger, H., Krasnova, H., and Buxmann, P. (2019). Understanding the role of social networking sites in the subjective well-being of users: A diary study. *European Journal of Information Systems*, *28*(2), 126-148. https://doi.org/10.1080/0960085X.2018.1496883

[79] Wong, C. S., Law, K. S., and Huang, G. h. (2008). On the importance of conducting construct-level analysis for multidimensional constructs in theory development and testing. *Journal of Management*, *34*(4), 744-764. https://doi.org/10.1177/0149206307312506

[80] Yamamoto, M., Nah, S., and Bae, S. Y. (2020). Social media prosumption and online political participation: An examination of online communication processes. *New Media & Society*, *22*(10), 1885-1902. https://doi.org/10.1177/146144 4819886295

[81] Yang, C., and Brown, B. B. (2013). Motives for using Facebook, patterns of Facebook activities, and late adolescents' social adjustment to college. *Journal of Youth and Adolescence*, *42*(3), 403-416. http://doi.org/10.1007/s10964- 012-9836-x

[82] Yu, J., Hu, P. J. H., and Cheng, T. H. (2015). Role of affect in self-disclosure on social network websites: A test of two competing models. *Journal of Management Information Systems*, *32*(2), 239-277. https://doi.org/10. 1080/07421222.2015.1063305

[83] Zhao, X., Lynch Jr, J. G., and Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, *37*(2), 197-206. http://doi.org/10.1086/651257

<Appendix A> Categorized SNS Actions

Authors	Context	Categories
Kim and Shen (2020)	Older adults' SNS activities and life satisfaction	- Directed communication activities (tag photos) - Broadcasting activities (update status, post photos)
Broughton et al. (2019)	How digital natives are using social networks	- Producing (post status, stories) - Consuming (feeds, stories) - Reacting (like, share posts)
Lee et al. (2016)	Use and social capital in adolescents	- Self-disclosure (post, update status) - Social monitoring (visit other's pages, keep up with friends' status) - Information sharing (share links) - Interpersonal communicating
Burke and Kraut (2016)	Exploring the relationship between SNS use and well-being	- Targeted, composed communication (chat, message) - One-click communication (like) - Passive consumption (read news feed, stories)
Mäntymäki and Islam (2016)	Positive and negative sides of SNS use in former university students	- Content consumption (watch profiles and photos, follow updates) - Content production (update status, add content, comment, tag)
Chang (2015)	Self-construal and SNS activities in college students	- Responding to others (browse information, comment, like) - Revealing on self (post, update status, share)
Yang and Brown (2013)	Motives and patterns of SNS activities	- Electronic interactions (post, comment) - Voyeuristic use (view content) - Self-presentation (post personal information) - Gaming
Burke et al. (2010); Burke et al. (2011)	SNS activities in adults	- Broadcasting (update, share, post) - Passive consumption (view content, click stories) - Communication-out (messages sent, comments written, likes given) - Communication-in (messages received, comments received, likes received)

<Appendix B> Measurement Items

Items (Sources)	
Consuming (CON): Currently, referring to Facebook, how often do you…?[1] (Yang & Brown, 2013)	
CON01	…check out people's walls without leaving a comment
CON02	…check out people's photos without leaving a comment
CON03	…check out people's notes, links, or status without commenting
CON04	…check out News Feed (D)
Communicating (COM): Currently, referring to Facebook, how often do you…?[1] (Yang & Brown, 2013)	
COM01	...send an inbox message
COM02	...chat with someone on Facebook
Commenting (REP): Currently, referring to Facebook, how often do you…?[1] (Yang & Brown, 2013)	
REP01	...reply to other people's comments
REP02	...comment on other people's posts
REP03	...comment on other people's walls
REP04	...give "likes" on other people's posts (D)
REP05	...post on other people's walls
General Sharing (GSH): Currently, referring to Facebook, how often do you…?[1] (J. Kim et al., 2015)	
GSH01	…share general content (e.g., video clips, links to news) from other websites
GSH02	…re-share people's posts about general content (e.g., video clips, links to news)
GSH03	…share information that I learned online or offline
GSH04	…post opinions on general topics on Facebook (e.g., events, news, video clips)
GSH05	…provide comments about shared general contents (e.g., events, news, video clips)
Personal Self-Disclosure (PSD): Currently, referring to Facebook, how often do you…?[1] (Almakrami, 2015)	
PSD01	...discuss your feelings on Facebook
PSD02	...post things about your private life on Facebook
PSD03	...write something personal about yourself on Facebook
PSD04	...share your deepest feelings on Facebook
PSD05	...keep your friends updated about what is going on in your life through Facebook
Strength of Social Ties (SST): How much do you agree or disagree with the next statements:[2] (Ma et al., 2014)	
SST01	I have good relationships with people in my Facebook network
SST02	I am in close contact with people in my Facebook network
SST03	I have strong ties with people in my Facebook network
Social Technology Fit (FIT): How much do you agree or disagree with the next statements: [2] (Lu & Yang, 2014)	
FIT01	Facebook's functions are suitable for helping me with social interactions
FIT02	Facebook's functions are enough to help me with social interactions
FIT03	Facebook's functions fit my social interactions' needs
Facebook Trust (FBT): How much do you agree or disagree with the next statements: [2](C.-W. Chang & Heo, 2014)	
FBT01	Facebook is a trustworthy social network
FBT02	I can count on Facebook to protect my privacy
FBT03	I can count on Facebook to protect my personal information from unauthorized use
FBT04	Facebook can be relied on to keep its promises

<Appendix B> Measurement Items (Cont.)

General Benefits (GBF): How much do you agree or disagree with the next statements: [2] (Limayem & Cheung, 2011)	
GBF01	Facebook is of benefit to me
GBF02	The advantages of Facebook outweigh the disadvantages
GBF03	Overall, using Facebook is advantageous
Use Frequency – Direct Measure (FQ_D) (Ellison et al., 2007; Park, 2014)*)*	
FQ_D01	Currently, how often do you use Facebook?[1]
FQ_D02	Currently, my frequency of Facebook use is…[3]
FQ_D03	Currently, my level of Facebook use is…[4]
FQ_D04	Facebook is part of my everyday activity[2]
FQ_D05	Facebook has become part of my daily routine[2]
Attention Questions (ATT)	
ATT01	I like Facebook more than other social media. Although we ask about your preference, please skip this question so we know you are paying attention
ATT02	How much do you agree or disagree with the next statement? [The cost of using Facebook is very high compared to other social media. Although we know it is not true, please select N/A so we know you are paying attention]

Notes:[1] Scale: Never, less than once a week, 1-3 times a week, 4-5 times a week, once a day, 2-3 times a day, 4-5 times a day, more than 5 times a day

[2] Scale: Strongly disagree, disagree, somewhat disagree, neutral, somewhat agree, agree, strongly agree

[3] Scale: Very infrequently, infrequently, somewhat infrequently, neutral, somewhat frequently, frequently, very frequently

[4] Scale: Very light, light, somewhat light neutral, somewhat heavy, heavy, very heavy(D) = Items dropped from the analysis

<Appendix C> Loadings and Crossloadings

Item	COM	CON	FBT	FIT	FQ	GBF	GSH	PSD	REP	SST
COM01	**0.93**	0.37	0.30	0.33	0.51	0.33	0.49	0.45	0.50	0.29
COM02	**0.93**	0.38	0.31	0.38	0.52	0.36	0.49	0.47	0.50	0.31
CON01	0.38	**0.85**	0.27	0.37	0.47	0.33	0.47	0.38	0.48	0.23
CON02	0.35	**0.88**	0.22	0.34	0.53	0.35	0.41	0.36	0.38	0.19
CON03	0.32	**0.86**	0.28	0.35	0.50	0.34	0.46	0.35	0.45	0.21
FBT01	0.34	0.30	**0.89**	0.40	0.52	0.56	0.46	0.46	0.48	0.37
FBT02	0.28	0.26	**0.95**	0.29	0.42	0.46	0.42	0.44	0.41	0.34
FBT03	0.27	0.25	**0.93**	0.29	0.41	0.43	0.39	0.38	0.39	0.33
FBT04	0.31	0.29	**0.95**	0.34	0.45	0.49	0.44	0.45	0.43	0.34
FIT01	0.34	0.37	0.32	**0.89**	0.53	0.61	0.35	0.30	0.38	0.48
FIT02	0.32	0.37	0.31	**0.91**	0.46	0.56	0.34	0.32	0.35	0.45
FIT03	0.37	0.37	0.34	**0.92**	0.51	0.61	0.39	0.34	0.38	0.51
FQ_D01	0.54	0.56	0.39	0.43	**0.89**	0.49	0.50	0.44	0.53	0.26
FQ_D02	0.48	0.50	0.45	0.49	**0.90**	0.61	0.48	0.46	0.55	0.31
FQ_D03	0.54	0.48	0.45	0.49	**0.86**	0.57	0.55	0.50	0.60	0.33
FQ_D04	0.46	0.52	0.45	0.51	**0.91**	0.66	0.44	0.36	0.47	0.34
FQ_D05	0.42	0.52	0.47	0.53	**0.90**	0.69	0.44	0.35	0.46	0.31
GBF01	0.35	0.35	0.42	0.61	0.58	**0.88**	0.42	0.37	0.43	0.43
GBF02	0.33	0.36	0.52	0.56	0.63	**0.90**	0.36	0.28	0.37	0.34
GBF03	0.32	0.35	0.49	0.60	0.61	**0.92**	0.41	0.36	0.43	0.40
GSH01	0.50	0.40	0.36	0.34	0.45	0.38	**0.89**	0.63	0.68	0.29
GSH02	0.46	0.44	0.42	0.39	0.51	0.42	**0.89**	0.62	0.69	0.29
GSH03	0.49	0.52	0.42	0.36	0.47	0.40	**0.87**	0.64	0.73	0.32
GSH04	0.44	0.44	0.42	0.33	0.45	0.36	**0.92**	0.70	0.75	0.32
GSH05	0.46	0.50	0.44	0.35	0.52	0.39	**0.89**	0.66	0.77	0.34
PSD01	0.42	0.42	0.38	0.32	0.44	0.34	0.67	**0.86**	0.64	0.28
PSD02	0.43	0.36	0.37	0.30	0.42	0.33	0.59	**0.88**	0.59	0.27
PSD03	0.41	0.35	0.41	0.31	0.42	0.35	0.62	**0.90**	0.63	0.29
PSD04	0.37	0.31	0.44	0.23	0.31	0.23	0.59	**0.84**	0.56	0.25
PSD05	0.49	0.34	0.42	0.36	0.45	0.36	0.65	**0.81**	0.66	0.36
REP01	0.53	0.45	0.40	0.38	0.59	0.41	0.75	0.63	**0.90**	0.38
REP02	0.49	0.45	0.40	0.39	0.59	0.44	0.74	0.61	**0.92**	0.36
REP03	0.48	0.48	0.44	0.36	0.50	0.43	0.73	0.66	**0.91**	0.34
REP05	0.42	0.42	0.41	0.33	0.40	0.35	0.67	0.65	**0.83**	0.33
SST01	0.22	0.18	0.27	0.47	0.33	0.38	0.27	0.28	0.31	**0.81**
SST02	0.34	0.25	0.39	0.48	0.33	0.40	0.34	0.33	0.38	**0.91**
SST03	0.28	0.20	0.32	0.45	0.27	0.36	0.30	0.29	0.34	**0.91**

Note: COM: Communicating, CON: Consuming, FBT: Facebook Trust, FIT: Social Technology Fit, FQ_D: Use Frequency (Direct Measure), GBF: General Benefits, GSH: General Sharing, PSD: Personal Self-Disclosure, REP: Commenting, SST: Strength of Social Ties

<Appendix D> Formulas for Higher-Order Reflective Constructs

Following Sarstedt et al. (2019) we applied the following formulas:

$$Composite\ reliability = \frac{(\sum l)^2}{(\sum l)^2+\sum(1-l^2)} \quad \cdots(1)$$

$$AVE = \frac{\sum l^2}{M} \quad \cdots(2)$$

$$Cronbach\ Alpha = \frac{M*\bar{r}}{(1+(M-1)*\bar{r})} \quad \cdots(3)$$

$$HTMT(A,B) = \frac{\bar{r}_{A,B}}{N\sqrt{\bar{r}_A*\bar{r}_B}} \quad \cdots(4)$$

Where:

In the case of higher-order reflective variables, loadings are the path coefficients from the higher-order to the lower-order variables

l = Loading

M = Number of loadings

$\bar{r}$ = Average correation between loadings

Assuming variable B is the higher-order construct

$\bar{r}_{A,B}$ = Average crossloadings of the items of A with the lower-order components of B

$\bar{r}_A$ = Average correlation between the items of A

$\bar{r}_B$ = Average correlation between the lower-order components of B

N = Number of lower-order components

Example for HTMT between producing (higher order) and consuming:

- From <Appendix C>, the average cross loadings of the items of consuming (CON01, CON02, CON03) with the lower-order (REP, PSD, GSH) components of producing is: (0.47 + 0.38 + 0.48 + 0.41 + 0.36 + 0.38 + 0.46 + 0.35 + 0.45) / 9 = 0.416
- The average correlation (the table of items correlation was not included for brevity) between the items of consuming (CON01, CON02, CON03) is = (0.64 + 0.59 + 0.66) / 3 = 0.626
- From <Table 3, the average correlation between the lower-order components of producing is: (0.73 + 0.72 + 0.82) / 3 = 0.754.
- Then HTMT (producing, consuming) is:

$$HTMT = \frac{0.416}{\sqrt[3]{(0.626)(0.754)}} = 0.534$$

◆ About the Authors ◆

Edgardo R. Bravo

Edgardo R. Bravo (er.bravoo@up.edu.pe) is an associate professor and head of the Engineering Department at Universidad del Pacífico (Peru). He received his Ph.D. in Management Sciences from ESADE (Spain), his MBA from ESAN University (Peru), and his degree in systems engineering from the National University of Engineering (Peru). His research interests are technology adoption and discontinuance, user adaptation, and technology impact. He has published in Information & Management, Behavior & Information Technology, Information Technology & People, Cognition, Technology & Work, Energies, and international conferences. Before joining academia, he managed technology and administrative areas in public and private organizations for over eighteen years. In addition, he has been a consultant to international organizations.

Christian Fernando Libaque-Saenz

Christian Fernando Libaque-Saenz (cf.libaques@up.edu.pe) is associate professor and former head of the Engineering Department at Universidad del Pacífico (Peru). He received his B.S. degree in Telecommunications Engineering from the National University of Engineering (Peru), and his M.A. and Ph.D. degrees in Information and Telecommunication Technology from the Korea Advanced Institute of Science and Technology (KAIST). Before starting his studies at KAIST, Christian worked for the Peruvian Ministry of Transport and Communications. Christian's research interests include digital divide, privacy, ICT strategy, and human-computer interaction. His publications have appeared in journals such as Information & Management, Telecommunications Policy, Government Information Quarterly, Behaviour and Information Technology, Telematics and Informatics, Service Business, as well as in international conferences.

Submitted: January 28, 2022; 1st Revision: April 21, 2022; Accepted: May 13, 2022