Social Commerce Intention, Social Interaction, and Social Support: Moderating Role of Social Anxiety

Chih-Lun Wu, National Taichung University of Science and Technology, Taiwan
https://orcid.org/0000-0003-4638-4233

Shwu-Min Horng, National Chengchi University, Taiwan*
https://orcid.org/0000-0002-9781-2202

ABSTRACT

A higher number of socially anxious users were found as more users joined social network sites. Since social commerce has become an important issue, this study investigated the effect of social anxiety on online users’ social commerce intention. Online social interactions are hypothesized to influence social commerce intention directly or indirectly through online social support. Four hundred twenty-seven effective samples were collected from Facebook users, and the results confirmed most of the causal effects. The study also tested the moderating effect of social anxiety on the causal effects. Of the eight relationships, social anxiety significantly moderates six of them. The relationships between online social interaction and emotional support and between online social interaction and social commerce intention are stronger for users with higher social anxiety. For users with lower social anxiety, the relationship between social support and the receiving of social commerce intention is stronger. The research findings lead to significant theoretical contributions and managerial implications.

KEYWORDS

Online Social Interaction, Online Social Support, Social Anxiety, Social Commerce, Social Network Sites

INTRODUCTION

Social networking sites (SNSs) are applications allowing users to communicate and connect with each other, to build up a personal network whose members share common interests, and to interact regularly in an organized way over the Internet. Over recent decades, social commerce has emerged following the rapid growth of SNSs and has considerably changed social media and e-commerce by adding commercial elements to social media (Liang et al., 2011; Shen et al., 2019). According to an eMarketer report (Garcia, 2018), social commerce has been regarded as one of the ten primary trends that will shape retail in the years ahead. Moreover, social commerce may generate great opportunities for various businesses in the cyber world and will continue developing into a multiple billion-dollar
market worldwide (Shen et al., 2019). Therefore, understanding users’ behaviour toward social commerce is one of the purposes of this study.

As SNSs have become a part of our lives, some negative influences have been studied and identified. For example, a high percentage of younger users have experienced cyberbullying that might cause profound psychosocial conditions, such as depression and anxiety (Wright, 2018). In some studies, depression and anxiety were considered to have similar symptoms, and anxiety was one of the psychological factors influencing users’ behaviour online. Social anxiety influences problematic SNS use through maladaptive emotion regulation strategies (Zsido et al., 2021). Vannucci et al. (2017) examined the relationship between social media use and anxiety in emerging adults and found that more time spent on social media leads to greater symptoms of dispositional anxiety and a higher chance of developing an anxiety disorder. Similar results were found among young adults (Primack et al., 2017) in which the use of multiple social media platforms, in addition to the time spent on social media, is associated with symptoms of depression and anxiety. As a result, social anxiety is becoming one of the key factors having an impact on users in the cyber world. The COVID-19 pandemic has caused a significant impact on individuals’ life and behaviour. Several studies have shown that their subjects suffered from anxiety and psychological distress (Petzold et al., 2020; Zheng et al., 2020). However, no literature is found to focus on social anxiety when studying social commerce. Therefore, one of the purposes of this study is to understand how social anxiety influences users’ behaviour toward social commerce intention. In general, social commerce intention (SCI) is hypothesized to be affected by both online social support and preference for online social interaction that is also the antecedent of online social support (Liang et al., 2011; Oh et al., 2014). Hence, the study investigates how social anxiety moderates the following three relationships: those between preference for online social interaction and SCI, between online social support and SCI, and between preference for online social interaction and online social support.

The remainder of this paper is organized as follows. The next section contains a review of relevant literature regarding the three constructs of social commerce, social support, and social interaction, followed by social compensation theory and social exchange theory to explain the moderating role of social anxiety on the causal relationships among the three constructs. The next section presents the hypotheses development and followed by methodology including the data collection and hypotheses testing results. The paper ends with the conclusion of the research, reports, the academic and managerial contributions, and discusses limitation and future work.

LITERATURE REVIEW AND THEORETICAL BACKGROUND

Social Commerce, Social Support, and Social Interaction

Rouibah et al. (2021) described social commerce as taking the electronic word of mouth (eWOM) where it never existed before in online shopping. Online consumers are able to search for opportunities to learn shopping expertise and experiences from each other to make effective purchasing decisions. Simply speaking, social commerce is eWOM utilized in e-commerce (Lin et al., 2019).

The intention to engage in social commerce was measured in one construct in one of the early studies (Liang et al., 2011). The researchers’ construct is: “we designed items to assess a user’s intention to recommend shopping information and products and the intention to receive shopping information and products on social networking sites.” In this statement, they identified two types of SCI, giving shopping information and receiving shopping information. Therefore, this study divides SCI into two aspects, receiving and giving, to arrive at a better understanding of users’ behaviour in SNSs. In addition, Horng and Wu (2020) also divided SCI into the two aspects, giving and receiving, and their differences were investigated and confirmed.

Social support is an individual’s perceived social resources, such as information generated by formal support groups and informal relationships (Gottlieb & Bergen, 2010). Joining an online
community provides users with a sense of belonging and strengthens group connections by interacting with other members. This emotional support tends to make members understanding and caring (Zhang et al., 2014). Through the creation of virtual groups, members could exchange product information by posting ratings, evaluations, suggestions, and referrals on the platform, and therefore have empowered themselves to have a substantial impact on social commerce intention (Sheikh et al., 2019). Both informational and emotional supports have been shown to have positive relationships with social commerce behaviour in various studies (Ko, 2018; Li & Ku, 2018; Li et al., 2019) and in a meta-analytic model involving 68 social commerce studies (Dwivedi et al., 2021).

Preference for online social interaction is a construct characterized by the belief that an individual is more comfortable interacting with others online than offline. Individuals develop a preference for online social interaction as an alternative to face-to-face communication because they perceive interacting with others online to be less threatening and more efficacious (Caplan, 2003). Chung (2013) tested the factors influencing the preference for social interaction in online support groups over offline interaction. After controlling other factors, the depth of relationships in an online social group was the most significant factor positively associated with preference for social interaction. The results indicate that those who have higher involvement in SNSs are more likely to develop a preference for social interaction. Therefore, preference for online social interaction will be used interchangeably with online social interaction in the remaining parts of this study. Social interactivity can lead to purchase intention (Lin et al., 2019) that is highly correlated with social commerce intention (Chen et al., 2017), and directly influence social support in SNSs (Oh et al., 2014). By conducting a literature review, social interaction is one of the key elements influencing users’ online buying behaviour in social commerce (Abdelsalam et al., 2020). In addition, social interaction has a positive impact directly on customer engagement behaviour in social commerce (Busalim and Ghabban, 2021).

**SOCIAL ANXIETY AND SOCIAL COMPENSATION HYPOTHESIS**

Anxiety, an emotional concept, reflects affective characteristics of humans and is generally known as mood, an emotional response and a specific anxiety condition including physiological, cognitive, and behavioural characteristics (Steimer, 2002) and feelings of worried thoughts, fear, stress, and nervousness; it also includes a variety of physical reactions in the human body, such as sweating, trembling, dizziness, and increased blood pressure (Kazdin, 2000).

Social anxiety, similar to the otaku phenomenon (Galbraith, 2010), is defined as “a state of anxiety resulting from the prospect or presence of interpersonal evaluation in real or imagined social settings” (Leary, 1983); it is characterized by an extensive fear of being evaluated by others (Wieser et al., 2010); it is also regarded as a form of shyness (Baker & Oswald, 2010; Madell & Muncer, 2006), and it is the most common type of anxiety for a personal life prevalence that affects more than 12% of the human population (Heeren et al., 2015; Stein & Stein, 2008). Socially anxious individuals describe their relationships with family, friends, and even partners as damaged (Erwin et al., 2004), and often feel afraid to talk in public or meet with strangers and are uneasy about making new friends in the real world (Prizant-Passal et al., 2016). Social anxiety is a disorder characterized by an intense fear of social situations causing impaired ability and considerable distress to function in at least some aspects of daily life (Prizant-Passal et al., 2016). Therefore, the Internet can be considered as a communication tool that makes it possible to avoid face-to-face contact with people. Social network sites (SNSs), such as Facebook and Twitter, may provide socially anxious individuals with a friendly environment to communicate with others and help them to expand their social life in the cyber world without interacting with others in the real world.

Social compensation hypothesis (SCH) postulates that the Internet provides users who feel uncomfortable engaging in face-to-face activities a more pleasing choice (Grieve et al., 2017; Weidman et al., 2012). Therefore, individuals who possess high social anxiety and low social skills
typically have difficulties forming interpersonal relationships in face-to-face interactions and adopt online activities to compensate for shortcomings they encounter in the offline world (Poley & Luo, 2012). Consequently, socially anxious individuals are more likely to utilize the Internet to experience their social life and enhance their social relationships, which they might consider more difficult to do during face-to-face interactions. Hence, socially anxious individuals turn to the Internet to communicate and form relationships with peers because such interactions would be more difficult to undertake in person (Laghi et al., 2013). According to SCH, individuals are likely to turn to the online environment for social relationships if they lack offline social relationships with others (Grieve et al., 2017). Consequently, compared to users with low social anxiety, individuals with high social anxiety react more strongly toward their relationships stemming from online social interaction. Therefore, this study applies SCH in order to explain users’ online behaviours in which the relationship between online social interaction and online social support, and between online social interaction and social commerce intention, are stronger for users who suffer from high social anxiety.

SOCIAL EXCHANGE THEORY

Social exchange theory is a psychological theory used to study interpersonal relationships (Cropanzano & Mitchell, 2005). It predicts that individuals attempt to reciprocate those who benefit them (Bateman & Organ, 1983). The low cost and easiness of information exchange on the Internet have deep motivational effects (Kollock & Smith, 2002). Social exchange theory has been applied to several studies regarding online users’ behaviour such as social commerce (Liang et al., 2011) and sharing behaviour across multiple social media platforms (Ham et al., 2019). Based on a literature review, it is a commonly used theory to explain online users’ social commerce behaviour (Zhang & Benyoucef, 2016).

To investigate how social anxiety affects an individual’s behaviour, Porter and Chambless (2017) examined the association between social anxiety and social support in the interpersonal relationships of two parties. Their results indicated that social anxiety is not associated with less support as rated by observers, and that socially anxious individuals report receiving less support from partners. It implies that, under the same level of social support, individuals with high social anxiety perceive less support than those with low social anxiety. According to social exchange theory, when users perceive less social support that represents a perceived benefit, this may influence their willingness to conduct social commerce. Therefore, when social support is positively associated with social commerce (Hajli et al., 2017; Liang et al., 2011), this relationship is weaker when online users have high levels of social anxiety.

In sum, for the relationships among online social interaction, online social support, and social commerce, social anxiety plays a moderating role differently. Based on social compensation hypothesis, social anxiety positively moderates the relationship between online social interaction (online social interaction) and online social support (social commerce intention). Consistent with social exchange theory, social anxiety negatively moderates the relationship between online social support and social commerce intention.

HYPOTHESES DEVELOPMENT

Research Framework

This study seeks to explain the relationships among social anxiety (SA), online social interaction (OSI), online social support (OSS), and social commerce intention (SCI). The research framework is shown in Figure 1. Online social interaction is hypothesized to influence social commerce intention directly and indirectly through online social support as shown in the upper part of the figure. Online social support and social commerce intention are divided into informational and emotional types of
social supports, and the giving and receiving of SCI, respectively (Liang et al., 2011). Social anxiety is assumed to have a moderating effect on all of the causal relationships as indicated in the lower part of the figure. However, as specified by the positive and negative signs, the relationships between online social interaction (OSI) and online social support (OSS) and between online social interaction (OSI) and social commerce intention (SCI) are expected to be stronger when social anxiety is higher (positive signs). When social anxiety is weaker (negative sign), the relationship between online social support and social commerce intention is hypothesized to be stronger.

**Research Hypotheses**

Since this paper focuses on the moderating role of social anxiety on all causal effects, the hypotheses development will first rationalize the causal relationships and then discuss the moderating effect of social anxiety on the relationships.

For online social interaction, some individuals appear to choose online social contact over face-to-face communication. Preference for online social interaction is a cognitive individual-difference construct characterized by the assumption that individuals feel safer, more efficacious, more secure and more relaxed with online interpersonal interactions and relationships than with conventional face-to-face social activities (Caplan, 2003; Chung, 2013; Yinghua & Lin, 2015). Hence, socially anxious individuals may develop a strong preference for online social interaction.

Online social support is one of the benefits and an important factor for individuals to maintain interpersonal relationships. The number of friends one has is the main source of social support (Boyd, 2006), and is one of the most widely studied constructs in the online social networking literature (Ellison et al., 2007; Kim & Lee, 2011; Oh et al., 2014). SNS users reciprocate online social support from others and behave similarly in social interactions. Therefore, frequent social interaction with other users can be interpreted as a high level of online social support (Oh et al., 2014). Human beings...
need social interactions to satisfy their social needs for belonging and support (Liang et al., 2011; Maslow et al., 1970). SNS provides a platform for online users to interact with each other and to exchange informational and emotional support based on their knowledge and personal experiences (Kaplan & Haenlein, 2010; Liang et al., 2011). Moreover, the social commerce of SNSs provides online social interactions, including information sharing, networking, and collaborating activities, to enable the mutual communication between online users (Li & Ku, 2018). Interactivity among users is regarded as a factor enabling close relationships among online users (Lin et al., 2019). Following Boyd (2006), this study hypothesizes that higher level of social interaction will strengthen the interpersonal relationships, which leads to stronger social support. Therefore:

**H1a:** Online social interaction is associated with informational support.

**H1b:** Online social interaction is associated with emotional support.

Based on social exchange theory, when individuals receive benefits from others, they reciprocate others’ support (Cropanzano & Mitchell, 2005; Emerson, 1976). An SNS is an IT platform for online users to share different forms of support such as informational and emotional. The interchange motivation resulting from the perception of online social support encourages online users to share purchasing experience, shopping information, product knowledge, and even brand loyalty with their online friends by e-word-of-mouth (eWOM), and to receive feedback from other online users (Kim et al., 2018). Social factors play an important role on consumers’ social commerce behaviour (Friedrich et al, 2021), and social support predicts consumers’ behavioural intention in social commerce (Goraya et al. 2021; Riaz et al. 2021). Hence, online social support enhances the social commerce intention on SNSs.

**H2a:** Informational support is associated with SCI-giving.

**H2b:** Emotional support is associated with SCI-giving.

**H3a:** Informational support is associated with SCI-receiving.

**H3b:** Emotional support is associated with SCI-receiving.

Chen et al. (2011) stated that WOM is a well-established construct in the marketing literature. In addition, Rouibah et al. (2021) defined social commerce as a type of WOM utilized in e-commerce, and social commerce also can be considered as a form of social interaction in which shopping information and purchasing experiences are exchanged. Furthermore, when online users conduct more online interactions with others, these actions serve to create a special atmosphere leading to a stronger social commerce intention (Liang et al., 2011). A survey-based study also demonstrates that social interaction strongly influences social commerce customer engagement (Busalim & Ghabban). Moreover, as mentioned in the literature on social exchange theory, when customers get benefits from a high level of interaction with a seller (giver) in social commerce, they tend to reciprocate the giver for the return as equal responses for purchase intention (Lin et al., 2019) that is highly associated with SCI-giving and SCI-receiving (Chen et al., 2017):

**H4a:** Online social interaction is associated with SCI-giving.

**H4b:** Online social interaction is associated with SCI-receiving.

Previous research has found that socially anxious individuals are likely to strengthen their Internet interactions to avoid face-to-face interactions (Prizant-Passal et al., 2016). Besides, Kraut et al. (2002) suggested that socially anxious individuals who spend a large amount of time interacting with others on the Internet are more likely to express greater comfort in interactions and higher reliance on the Internet as a social outlet to the exclusion of face-to-face interactions. Such individuals are more inclined to acknowledge that they are comfortable initiating and maintaining online relationships
with others and prefer discussing their problems with other users on the Internet rather than through face-to-face interactions.

Lee and Stapinski (2012) proposed that face-to-face avoidance is an important element of social anxiety. According to the social compensation hypothesis, socially anxious individuals may compensate for poor offline relationships by pursuing their social life to gain social support in the cyber world (Beaudry & Pinsonneault, 2010). Peter and Valkenburg (2006) found that users with high social anxiety perceived internet communication to be more reciprocal, broader and deeper than regular communication. A survey of Facebook users indicated that individuals with a high degree of shyness reported stronger associations between online usage and friendship quality (Baker & Oswald, 2010). Shyness is one of the characteristics of socially anxious people and friendship quality can be considered equivalent to social support.

Socially anxious individuals have a strong intention to explore the online relationships which they perceive as less threatening than traditional face-to-face interactions that others may take part in (Stevens & Morris, 2007). Virtual social situations are especially suitable for measuring overt attention in an ecologically valid environment (Mühlberger et al., 2008). Thus, socially anxious individuals may prefer and trust online users’ opinions and experiences rather than those of their counterparts in real life. Prior studies have found that online social support positively influences the usages of SNS for HSA (Indian & Grieve, 2014). Since socially anxious individuals are afraid to make contact with others in real life, they tend to rely more on online social support, including informational and emotional support.

Social anxiety was also found to moderate the relationship between online communication and online self-disclosure (Wang et al., 2011). Users who are usually anxious in face-to-face settings can feel more relaxed when talking about private topics online. Similar results were found in the study by Shalom et al. (2015) in which users with high social anxiety perceived greater success in computer-mediated communication than they did in face-to-face communication.

Based on the above statements, socially anxious individuals have a strong intention to explore the online relationships they perceive as less threatening than traditional face-to-face interactions (Stevens & Morris, 2007). Virtual social situations are especially suitable for measuring overt attention in an ecologically valid environment (Mühlberger et al., 2008). Thus, socially anxious individuals may prefer and trust online users’ opinions and experiences rather than the opinions and experiences of individuals in real life. They may also feel more comfortable expressing their opinions online. Therefore, this study proposes:

**H5**: Social anxiety positively moderates the relationship between online social interaction and online social support including informational and emotional supports.

**H6**: Social anxiety positively moderates the relationship between online social interaction and social commerce including giving and receiving.

Porter and Chambless (2017) investigated intimate relationships among socially anxious individuals. According to participants, socially anxious individuals received less support from their partners during their interactions, but, in fact, observers reported differently. In an established relationship such as the perceived social support leading to social commerce intention, individuals with high anxiety regardless of the level of support they actually receive, perceive less support than those with low anxiety. Kraut et al. (2002) proposed a similar model, the rich-get-richer, which predicts that those who have existing social support and are highly sociable will get more social benefits from utilizing the Internet. Another study also provided results which indirectly confirm this model (Selfhout et al., 2009).

Therefore, when social support has a positive influence on social commerce intention, users with higher social anxiety will perceive less social support, and therefore, the relationship between social support and social commerce intention will be weakened. That leads to the next hypothesis as follows:
H7: Social anxiety negatively moderates the relationships between informational support and SCI-giving, emotional support and SCI-giving, informational support and SCI-receiving, and emotional support and SCI-receiving.

METHODOLOGY

Research Method

This research is predictive-explanatory and contains reflective measurement models. Hence, by following the guidelines proposed by Henseler (2018), this study utilized the partial least squares (PLS) method for structured equation modelling (SEM) analysis to test the causal effects of the research model. The following features illustrate the appropriateness of using PLS in this study. First, PLS can be regarded as a structural equation modelling (SEM) technique that can handle various forms of construct operationalization, including reflective measurement and composite models (Henseler, 2018). Second, PLS includes a measurement model and a structure model simultaneously (Hair Jr & Hult, 2016; Hair Jr et al., 2017). Third, while social anxiety is the subject most often studied in the fields of psychology and medicine (Rodebaugh et al., 2004; Stein & Stein, 2008), this research is the first to explore the influence of social anxiety on social commerce behaviour. Several studies have recommended PLS for exploratory studies (Barclay et al., 1995; Gefen et al., 2000; Hair et al., 2020). Fourth, Since moderating effects are tested in this is study, Multi-group analysis (MGA) through PLS-SEM is an efficient way to evaluate moderation through multiple relationships as opposed to standard moderation, which explores a single structural relationship at a time (Matthews, 2017).

The study adopted SmartPLS 3.3.2 to analyse the measurement model and the structure model simultaneously. The validity of the constructs was assessed on unidimensionality, composite reliability, and convergent, and discriminant validity. The MGA was also tested by PLS in this study.

Data Collection

Because the survey target samples are not native speakers of English, this study translated the questions into Chinese. Moreover, to ensure a precise translation from English into Chinese, we hired four professionals to undertake a backward translation. The measurement of items was confirmed after several forward and backward, English-to-Chinese and Chinese-to-English translations, respectively.

Facebook is the SNS with the most active users and has provided research samples under scrutiny (Valenzuela et al., 2009). The monthly global active users totalled 2.27 billion in the second quarter of 2018 (Ahlgren, 2019). Therefore, it was deemed appropriate to collect samples from Facebook to test the research model of this research for studying social commerce (Chen et al., 2016; Huang & Benyoucef, 2013, 2015). Similar to several studies regarding social commerce (Horng & Wu, 2020; Liang et al., 2011), samples were collected from a university in Taiwan that included graduate and undergraduate students. By using an on-campus service, email invitations were sent to students with a link to the survey for them to answer the questions online. Out of 450 preliminary samples, 23 samples with incomplete data were deleted, resulting in 427 valid samples and an effective sample collection rate of 94.9% as shown in Table 1. The distribution of gender is similar to the results of other surveys (Smith, 2015). Most of the respondents were under the age of 22 and had one to three years of SNS experience. Prior studies regarding SNS users’ behaviour demonstrate sample age range from 18 to 30 years (York, 2017). Other researches also had respondents of Facebook users in Taiwan as their target sample (Horng & Wu, 2020; Liang et al., 2011). Except for social anxiety as shown in the Appendix, a seven-point Likert scale was used with 1 and 7 representing strongly disagree and
strongly agree, respectively, for the other questions. Seven items with low loadings or cross loadings were deleted after the pilot test. The questionnaires were distributed on Facebook.

**Reliability and Validity**

Table 2 shows the questions and their corresponding loadings, and sources. The standardized loadings ranged from 0.717 to 0.950 and all of them are higher than the acceptable value of 0.7 (Fornell and Larcker, 1981).

Table 1. Demographics of respondents

| Category          | Count | Percentage |
|-------------------|-------|------------|
| Gender            |       |            |
| Male              | 164   | 38.40%     |
| Female            | 263   | 61.60%     |
| SNS Using Experience (in years) |       |            |
| 1–3               | 228   | 53.40%     |
| 3–5               | 152   | 35.60%     |
| >5                | 30    | 7.00%      |
| Age               |       |            |
| <=22              | 378   | 88.52%     |
| 23–30             | 49    | 11.48%     |

Table 2. Measurement items

| Constructs                | Items | Questions                                      | Loadings | Source                                      |
|---------------------------|-------|-----------------------------------------------|----------|--------------------------------------------|
| Social Anxiety            | S1m1  | Afraid (Sum of 24 items from Liebowitz’s Social Anxiety Scale) | 0.910*** | (Liebowitz et al., 1985)                   |
|                           | S2m1  | Avoidance (Sum of 24 items from Liebowitz’s Social Anxiety Scale) | 0.920*** |                                             |
| Online Social Interaction (Social Control) | Scol1 | When I am online, I socialize with other people without worrying about how I look. | 0.745*** | (Caplan, 2003)                           |
|                           | Soc2  | I can control how others perceive me when online. | 0.827*** |                                             |
|                           | Soc3  | When I am online, I socialize with people without worrying about relational commitment. | 0.746*** |                                             |
| Online Social Interaction (Social Benefits) | Sco1  | I am treated better in my online relationships than in my face-to-face relationships. | 0.898*** | (Caplan, 2003)                           |
|                           | Sco2  | I am more confident socializing online than I am offline. | 0.886*** |                                             |
|                           | Sco3  | I feel safer relating to people online rather than face-to-face. | 0.890*** |                                             |
| Online social support (Informational) | Im1   | On Facebook, some people offer suggestions when I need help. | 0.800*** | (Kraus and Markides, 1990)                  |
|                           | Im2   | When I encounter a problem, some people on Facebook give me information to help me overcome the problem. | 0.915*** |                                             |
|                           | Im3   | When faced with difficulties, some people on Facebook help me discover the causes and provide me with suggestions. | 0.880*** |                                             |
| Online social support (Emotional) | Em1   | When faced with difficulties, some people on Facebook comfort and encourage me. | 0.894*** | (Kraus and Markides, 1990)                  |
|                           | Em2   | When faced with difficulties, some people on Facebook express interest in and concern about my well-being. | 0.925*** |                                             |
|                           | Em3   | When faced with difficulties, some people on Facebook listen to me talk about my private feelings. | 0.714*** |                                             |
|                           | Em4   | When faced with difficulties, some people on Facebook want my advice on various other things. | 0.900*** |                                             |
| Social Commerce Intention (SCI-Giving) | Giv1  | I am willing to provide my experiences and suggestions when my friends on Facebook want my advice on buying something. | 0.819*** | (Liang et al., 2011)                      |
|                           | Giv2  | I am willing to share my own shopping experiences with my friends on Facebook. | 0.916*** |                                             |
|                           | Giv3  | I am willing to recommend a product that is worth trying to my friends on Facebook. | 0.907*** |                                             |
| Social Commerce Intention (SCI-Receiving) | Rec1  | I consider the shopping experiences of my friends on Facebook when I want to shop. | 0.884*** | (Liang et al., 2011)                      |
|                           | Rec2  | I ask my friends on Facebook to provide me with their suggestions before I go shopping. | 0.879*** |                                             |
|                           | Rec3  | I am willing to buy the products recommended by my friends on Facebook. | 0.823*** |                                             |
Composite reliability (CR), ranging from 0.817 to 0.922, and AVE, ranging from 0.598 to 0.795 shown in Table 3, both exceeded the recommended CR score of 0.7 and AVE score of 0.5 (Fornell & Larcker, 1981), respectively. As for the square root of AVE, the numbers on the diagonal were larger than the off-diagonal elements in the corresponding rows and columns. All of the measures indicated that this study had adequate reliability and validity for further analysis (Fornell & Larcker, 1981).

To measure common method variance (CMV) (Ali et al., 2018; Babin et al., 2016), Harmon’s test in which all of the indicators of the survey are measured by factor analysis with one factor conducted. A potential CMV problem may not exist if the extracted sums of the squared variance are less than 50%. The extracted sum of the squared variance in the factor analysis for the constructs is 34.82%, which indicates CMV is unlikely to contaminate this study’s testing results.

Model Fit Evaluation and Hypotheses Testing Results for the Full Model

The coefficient of determination (R² value) is the most widely utilized way of measuring a structural model (Hair Jr et al., 2017). It measures the predictive accuracy of the research model, the results of which are shown in Fig. 2. The R² of the constructs are 0.156, 0.162, 0.174, and 0.186, respectively. These values are all considered acceptable when studying consumer behavior (Hair Jr & Hult, 2016). Nine out of ten causal effects test positive in which six are significant at 0.01, two are significant at 0.05, and one is significant at 0.1. Only one hypothesis is insignificant. In addition, Chin (1998) suggests using the Q² value to examine the theoretical/structural model, and a Q² greater than 0 implies that the model has predictive relevance (Barroso et al., 2010). All Q² values in Fig. 2 are greater than 0 indicating that observed values are well reproduced by the model and its parameter estimates.

Table 3. CR, AVE, Correlation between constructs and square roots of AVE

| Composite Reliability | AVE 1 | AVE 2 | AVE 3 | AVE 4 | AVE 5 | AVE 6 |
|-----------------------|-------|-------|-------|-------|-------|-------|
| OSI - Social Control  | 0.817 | 0.598 | 0.773 | 0.811 | 0.817 | 0.816 |
| OSI - Social Benefit  | 0.921 | 0.794 | 0.438 | 0.891 | 0.921 | 0.920 |
| Informational Support | 0.921 | 0.793 | 0.236 | 0.108 | 0.892 | 0.921 |
| Emotional Support     | 0.922 | 0.749 | 0.218 | 0.164 | 0.715 | 0.365 |
| SCI - Giving          | 0.921 | 0.795 | 0.147 | 0.160 | 0.931 | 0.357 |
| SCI - Receiving       | 0.904 | 0.759 | 0.145 | 0.113 | 0.404 | 0.387 |

Notes: OSI: Online Social Interaction; SCI: Social Commerce Intention; CR: Composite Reliability; AVE: Average Variance Extracted; Numbers on the diagonal (in boldface) are the square root of the average variance extracted (AVE). Other numbers are the constructs’ correlation.

Figure 2. Results of the PLS analysis
A goodness of fit measure (GOF) is an important indicator for PLS path modelling ranges from 0.00 to 1.00 and is defined as the geometric mean for endogenous constructs of the average variances extracted and the average $R^2$ (Wetzels et al., 2009). The three effect sizes proposed for $R^2$ have different acceptable GOF values, GOF\(_{small}\)=0.1, GOF\(_{medium}\)=0.25, and GOF\(_{large}\)=0.36, respectively (Choshin & Ghaffari, 2017; Wetzels et al., 2009). The GOF is 0.486 in this study, exceeding the cut-off value of 0.36 for GOF\(_{large}\) thereby indicating that the model performs well with respect to the pre-defined baseline values.

### Multi-Group Analysis (PLS-MGA)

After analyzing the full model, the samples were divided into three groups based on the scores measuring social anxiety. Removing the group clustered around the medium point results in two groups, one with high social anxiety (HSA) for 138 samples and the other one with low social anxiety (LSA) for 156 samples. The number of responses for each subgroup follow the recommendations for a statistical power of 80% (Cohen, 1992; Hair Jr & Hult, 2016). Next, the study proceeded with a multi-group analysis to test the moderating effects of social anxiety (Hair Jr et al., 2017).

This study compared the two subsamples of individuals with high social anxiety (HSA) and those with low social anxiety (LSA) for each path coefficients using the PLS-MGA approach. This approach aimed at comparing the two sample groups to assess the statistical differences in group-specific parameter estimates (Henseler, 2012; Matthews, 2017). Before applying the PLS-MGA, this study tested the measurement invariance of composite models (MICOM) by applying a permutation procedure (Wong, 2019). The outcome of MICOM showed no substantial difference between variance and average values for the two subsamples since the differences in mean and variance values were in the 95% confidence interval. This indicated no invariance problem affecting the outcome, thus allowing this research to proceed with the multi-group analysis (Henseler et al., 2016). This research processed a measurement invariance test to ensure that the discrepancies between the two groups of the estimation model did not influence results for latent variables in the sample (Henseler et al., 2016; Solovida & Latan, 2017).

Figures 3 and 4 are the results of the research framework for HSA and LSA, respectively. Table 4 combined the two figures to show the results of the moderating effects of social anxiety. The last column of the table indicates that H5, H6, and part of H7 (the moderating test for H3a and H3b) are supported. As hypothesized, higher social anxiety (HSA) strengthens the relationships regarding H1a, H1b, H4a, and H4b. For the moderating effect of social anxiety on the relationships between social support and social commerce, lower social anxiety (LSA) shows a stronger relationship between SCI-receiving and both social supports including informational ($t$-value of -1.531) and emotional ($t$-value -0.089).

---

**Figure 3. Results of the PLS analysis for HSA Model**

![Figure 3. Results of the PLS analysis for HSA Model](image)
of -1.327). In addition, when considering the relationship between SCI-giving and social support (H2a and H2b), low social anxiety displays higher coefficients (0.418 vs. 0.397; 0.134 vs. -0.035) but is not significantly different. When considering the causal effects of high and low social anxiety, respectively, each has two insignificant results. Emotional support is not associated with SCI-receiving and SCI-giving for high social anxiety, while H3b and H4b are not supported for low social anxiety.

**CONCLUSION AND FUTURE WORK**

**Conclusion**

SNSs have been growing rapidly and one of their features, social commerce, has become an important factor in online retailing. As more users use SNSs as a convenient way to conduct e-commerce, personal characteristic features such as social anxiety play an important role in influencing users’ online behaviour. In addition, the COVID-19 pandemic has been an additional source of anxiety. Understanding the impact of social anxiety on users’ behaviour has become an important research issue. This study first investigated three important constructs, online social interaction (OSI), online social support (OSS), and social commerce intention (SCI). OSI is hypothesized to influence SCI directly and indirectly through OSS. In order to have a better understanding of the constructs, online
social support is divided into emotional and informational supports, while social commerce intention is divided into receiving and giving (Horng & Wu, 2020; Liang et al., 2011). Furthermore, this study examines the moderating role of social anxiety on the relationships between OSI and OSS, OSI and SCI, and OSS and SCI. All of the hypothesis testing results are shown in Table 5.

The result of H1b is consistent with that of (Lin et al., 2019). It supports H1a and H1b which assert that SNS serves as a platform for users to chat, discuss, and enhance mutual communication while interactivity is a critical factor in fulfilling the needs for belonging and information (Oh et al., 2014). The significant results for H2a, H2b, H3a, and H3b are consistent with the study by Li and Ku (2018) and Liang et al. (2011), in which social support that is formed by emotional and informational support is positively associated with SCI-receiving and SCI-giving, respectively. Moreover, emotional support, represented by different constructs with similar concepts in other studies, is also significantly correlated to SCI-giving and SCI-receiving (Beaudry & Pinsonneault, 2010; Zhang et al., 2019).

H4b is the only unsupported hypothesis for causal effects. Online social interaction does not have a direct influence on SCI-receiving but is associated with it indirectly through online social support. This indicates that users’ online interaction does not directly lead to searching for product information unless users feel emotional support from others on the site or are provided with useful information. Emotional support could represent trust toward the SNS while informational support is also an antecedent of trust toward the website (Li, 2019). Both types of trust, toward the SNS and toward the website, are strong predictors of SCI (Hajli et al., 2017). This result differs somewhat from another study (Horng & Wu, 2020) in which SNS behaviours, including browsing and participating, are associated only with SCI-receiving, and not SCI-giving. When online interaction involves socialization activities, SNS behaviours include only browsing and participating in Horng and Wu’s study and may not be related to interacting with others. This may explain the different results between the two studies. Social activities could trigger reciprocal behaviour such as giving information to others, while browsing and participating may only lead to receiving others’ postings based on cost and benefit analysis, which is the core of social exchange theory.

In terms of the moderating effects, the social compensation hypothesis (Grieve et al., 2017; Poley & Luo, 2012) successfully predicts that high social anxiety (HSA) leads to stronger relationships between OSI and the other two constructs, OSS and SCI, respectively, compared to low social anxiety (LSA). It is difficult for users with high social anxiety to establish interpersonal relationships offline and therefore they exhibit stronger reactions online when interacting with other users. Moreover, according to self-presentation theory (Bern, 1972), some individuals, especially those with a high level of social anxiety, may feel able to express hidden self-aspects on the Internet (characteristics that are actually part of themselves but are not usually expressed in their daily lives) (McKenna et al., 2002). Possible and ideal selves may also be presented online, as shown by the SNS profiles content analysis (Manago et al., 2008). Therefore, socially anxious individuals who usually have little social experience face-to-face may prefer online social interaction because they perceive greater control over self-presentation and less pressure for physical contact. As a result, the consequent behaviour or

### Table 5. Results of the hypotheses

| Hypothesis                          | Causal Effects | Modering Effects |
|-------------------------------------|----------------|------------------|
| H1a       Online Social Interaction -> Informational Sup. | Supported       | H5 H>L Supported |
| H1b       Online Social Interaction-> Emotional Sup.     | Supported       | H5 H>L Supported |
| H2a       Informational Support -> SCI-Giving            | Supported       | H7 L>H Not Supported |
| H2b       Emotional Support-> SCI-Giving                  | Supported       | H7 L>H Not Supported |
| H3a       Informational Support -> SCI-Receiving          | Supported       | H7 L>H Supported  |
| H3b       Emotional Support-> SCI-Receiving                | Supported       | H7 L>H Supported  |
| H4a       Online Social Interaction-> SCI-Giving          | Supported       | H6 H>L Supported  |
| H4b       Online Social Interaction-> SCI-Receiving       | Not Supported   | H6 H>L Supported  |
perception stemming from online social interactions tends to be amplified by users with high social anxiety. In addition, users with HSA are more sensitive to physiological arousal (Anderson & Hope, 2009) and consequently are more likely to have a response when interacting with others online.

The results for the moderating effect of social anxiety on the relationship between OSS and SCI are mixed, although all of the signs for the coefficient difference tests are negative, as expected. The significant moderating effects can be found in the two relationships between informational support and SCI-receiving (t value of -1.531 in Table 3) and between emotional support and SCI-receiving (t value of -1.327 in Table 3), while the moderating effects on the other two relationships regarding SCI-giving are insignificant. As discussed previously, when users engage in interactions online, those with high social anxiety perceive online social support less than those with low social anxiety because they perceive less support. Therefore, all of the four coefficients representing the relationships between social support and SCI are higher in LSA than in HSA. Based on social exchange theory, the benefit of receiving product information is very likely higher than giving product information. Consequently, only the moderating effects of social anxiety for hypothesis 7 on H3a and H3b are significant (t value of -1.531 and -1.327 in Table 3).

It is interesting to observe that the two causal effects for HSA (H2b with a t-value of 0.317 and H3b with a t-value of 0.744) and LSA (H4b with a t-value of 0.075 and H3b with a t-value of 1.108), respectively, are insignificant as shown in Table 3. For HSA users, both H2b and H3b regarding SCI-receiving show insignificant results (t-value of 0.317 and 0.744, respectively, in Table 3). They do not perceive enough online social support for them to conduct social commerce activities, including giving as well as receiving, possibly because the benefit from emotional support is not as strong as it is from informational support. For LSA, both H4b and H3b regarding SCI-receiving show insignificant results (t value of 0.075 and 1.108 in Table 3). The only path leading LSA users to SCI-receiving is through informational support (H3a with t-value 4.358). It seems that LSA users evaluate costs and benefits carefully and conduct SCI-receiving after they accumulate enough trust toward their friends on the SNS. The last finding is that LSA users are able to reach SCI-giving by OSI directly or through emotional support indirectly. Users with low social anxiety are usually extroverts who highly value their status in their social group (Lee, 2009). Therefore, reputation, an important predictor for users posting behaviour on SNS (Horng, 2016), and a factor that is excluded in the research model, might play an important mediated role in these results.

**Theoretical Contributions**

First, dividing social commerce into receiving and giving allows this study to achieve a higher comprehension of SCI while Liang et al. (2011) utilized giving and receiving as second-order constructs to present a first-order construct as social commerce intention. The results indicate that giving and receiving represent two different kinds of social commerce behaviours in that they have different antecedents and react differently to the same mediator. The results of another study also confirmed the differences between SCI-giving and SCI-receiving (Horng & Wu, 2020). In fact, research regarding eWOM has treated receiving differently from giving in several studies (Chu & Kim, 2011; López & Sicilia, 2014; Reichelt et al., 2014).

Second, although prior studies have examined social anxiety and its influence on users’ behaviours on SNSs (Caplan, 2007; Chen et al., 2020; Pierce, 2009), this research may serve as a pioneering study in investigating the relationships between social anxiety and social commerce intention. In general, higher social anxiety strengthens the relationships between online social interaction and online social support and between online social support and social commerce intention based on the social compensation hypothesis (Desjarlais & Willoughby, 2010). When an online relationship has been established and users have perceived their social support from interacting with other online users, social exchange theory can be applied to explain the negative moderating role of social anxiety on the relationship between online social support and social commerce intention for cost and benefit analysis. Since SCI-giving is not a strong benefit perceived by HSA users, the negative moderating
role of social anxiety is only significant on SCI-receiving, not on SCI-giving. In addition, using electroencephalogram to test the anxiety level of participants, Li et al. (2021) conclude that strong-tie mechanisms can lead to a lower level of user anxiety, which in turn encourages users to participate in the social mobile marketing campaign. Consistent with Li et al.’s (2021) findings, we document that the moderating role of social anxiety in the relationship between social support and social commerce intention. The combined evidence suggests that users’ online behavior is inconsistent over various states, including interactions, perception of social support, and social commerce intention. The transition of states in responding to the various business models will require different strategies to operate effectively. Further discussion is presented in the following section on managerial implications.

Managerial Implications

The results of a previous study showed that internet use for purposes such as social commerce predicted higher social anxiety (Selfhout et al., 2009). It implies that the more time users spend online, the more socially anxious users will be found online. Therefore, understanding the role of social anxiety on social commerce intention is an important practical issue for practitioners. For HSA users, emotional support does not lead to social commerce intention for both giving and receiving. In fact, even for LSA users, the relationship between emotional and social commerce is either insignificant (H3b with t-value of 1.108 in Table 3) or significant only at 0.1 (H2b with t-value of 1.531 in Table 3). This finding explains why some retailing-focused online websites such as Amazon provide only social commerce functions as product ratings and commenting while virtual communities, an important venue for social support, are not promoted or established on their websites. A cost-and-benefit evaluation based on social exchange theory is a better way to encourage social commerce. This can be seen in Table 3 where H2a and H3a are the two most significant results for the full data (coefficients of 0.273 and 0.257), HSA (coefficients of 0.397 and 0.251), and LSA (coefficients of 0.418 and 0.496), respectively. Another study by Horng (2016) also provided a real case where Groupon in Taiwan terminated its virtual community established internally online and focused on its core business, a group-buying business model. For the websites that have retailing as their primary business model and would like to implement social commerce, establishing virtual communities on their websites is not recommended.

SNSs such as Facebook can apply big data analysis (Leung et al., 2018) to identify its users with varying degrees of social anxiety. For LSA users, SCI-receiving can only be influenced by informational support, not by online social interaction or emotional support. If an SNS would like to promote social commerce or extend its services to online retailing, creating a user interface that can help its members to easily access and post product information will be critical to its success. In general, emotional support seems to work better for non-HSA users, and this may change mainstream thinking about HSA to seek emotional support online prior to posting product information. Therefore, an SNS could divert the two different groups of HSA and LSA users to encourage their social commerce intention.

According to the State of Mental Health in America report (MHA, 2020), 19 percent of the population in the U.S., equivalent to 47.1 million persons, live with a mental health issue at an increasing rate. The statistics implies that the number of people with social anxiety has increased most likely due to the COVID-19 pandemics. Hence, the findings of this study provide adequate and timely solutions for online services that utilize social commerce to provide their services more efficiently.

Research Limitations and Future Work

First, this empirical study tested a research model based on samples from users of a single SNS, Facebook, so the results may not be directly applicable to other SNSs such as Twitter, Line, and Weibo to the extent that different SNSs may have different features and purposes for their users. Future investigations could survey multiple SNSs to obtain more generalized results.
Second, although it might be acceptable for an exploratory study to collect data from students, samples that contain mostly students might not represent the general population. However, a further survey for users covering a wide range of respondents will strengthen the results.

Third, this study is limited to cross-sectional empirical research and future research could conduct a longitudinal study to further observe how the transition of social anxiety influences social commerce intention and the relationships with antecedents.

Four, this paper will make more incremental contributions if we can study the effects of social anxiety on those causal relationships before and after the COVID-19 pandemic. However, we have not reached to the post-pandemic regime as yet. We leave this issue to future research.

Five, as mentioned previously in managerial implications, applications of social commerce may involve various business models in which the role of social commerce may be different depending on the specific contexts. Further studies could focus on clarifying the business models utilizing social commerce to conduct more detailed analyses.
REFERENCES

Abdelsalam, S., Salim, N., Alias, R. A., & Husain, O. (2020). Understanding online impulse buying behavior in social commerce: A systematic literature review. *IEEE Access: Practical Innovations, Open Solutions, 8*, 89041–89058. doi:10.1109/ACCESS.2020.2993671

Ahlgren, M. (2019). *Facebook statistics for 2019*. Retrieved 4/25 from https://www.websitehostingrating.com/facebook-statistics/

Ali, F., Rasoolimanesh, S. M., Sarstedt, M., Ringle, C. M., & Ryu, K. (2018). An assessment of the use of partial least squares structural equation modeling (PLS-SEM) in hospitality research. *International Journal of Contemporary Hospitality Management, 30*(1), 514–538. doi:10.1108/IJCHM-10-2016-0568

Anderson, E. R., & Hope, D. A. (2009). The relationship among social phobia, objective and perceived physiological reactivity, and anxiety sensitivity in an adolescent population. *Journal of Anxiety Disorders, 23*(1), 18–26. doi:10.1016/j.janxdis.2008.03.011 PMID:18436426

Babin, B. J., Griffin, M., & Hair, J. F. Jr. (2016). Heresies and sacred cows in scholarly marketing publications. *Journal of Business Research, 69*(8), 3133–3138. doi:10.1016/j.jbusres.2015.12.001

Baker, L. R., & Oswald, D. L. (2010). Shyness and online social networking services. *Journal of Social and Personal Relationships, 27*(7), 873–889. doi:10.1177/0265407510375261

Barroso, C., Carrión, G. C., & Roldán, J. L. (2010). Applying maximum likelihood and PLS on different sample sizes: Studies on SERVQUAL model and employee behavior model. In V. Esposito Vinzi, W. W. Chin, J. Henseler, & H. Wang (Eds.), *Handbook of Partial Least Squares: Concepts, Methods and Applications* (pp. 427–447). Springer. doi:10.1007/978-3-540-32827-8_20

Bateman, T. S., & Organ, D. W. (1983). Job satisfaction and the good soldier: The relationship between affect and employee “Citizenship”. *Academy of Management Journal, 26*(4), 587–595. doi:10.2307/255908

Beaudry, A., & Pinsonneault, A. (2010). The other side of acceptance: Studying the direct and indirect effects of emotions on information technology use. *Management Information Systems Quarterly, 34*(4), 689–710. doi:10.2307/25750701

Bern, D. (1972). Self perception theory. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology: Vol. 6*. Academic Press.

Boyd, D. (2006). *Friends, friendsters, and myspace top 8: Writing community into being on social network sites*. Academic Press.

Busalim, A. H., Ghabban, F., & Hussin, A. R. C. (2021). Customer engagement behaviour on social commerce platforms: An empirical study. *Technology in Society, 64*, 101437. doi:10.1016/j.techsoc.2020.101437

Caplan, S. E. (2003). Preference for online social interaction: A theory of problematic internet use and psychosocial well-being. *Communication Research, 30*(6), 625–648. doi:10.1177/0093650203257842

Caplan, S. E. (2007). Relations among loneliness, social anxiety, and problematic internet use. *Cyberpsychology & Behavior, 10*(2), 234–242. doi:10.1089/cpb.2006.9963 PMID:17474841

Chen, A., Lu, Y., & Wang, B. (2017). Customers’ purchase decision-making process in social commerce: A social learning perspective. *International Journal of Information Management, 37*(6), 627–638. doi:10.1016/j.ijinfomgt.2017.05.001

Chen, J. V., Su, B., & Widjaja, A. E. (2016). Facebook C2C social commerce: A study of online impulse buying. *Decision Support Systems, 83*, 57–69. doi:10.1016/j.dss.2015.12.008

Chen, Y., Li, R., Zhang, P., & Liu, X. (2020). The moderating role of state attachment anxiety and avoidance between social anxiety and social networking sites addiction. *Psychological Reports, 123*(3), 633–647. doi:10.1177/0033294118823178 PMID:30612521

Chen, Y., Wang, Q., & Xie, J. (2011). Online social interactions: A natural experiment on word of mouth versus observational learning. *JMR, Journal of Marketing Research, 48*(2), 238–254. doi:10.1509/jmkr.48.2.238
Chin, W. W. (1998). The partial least squares approach to structural equation modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (Vol. 295, pp. 295–336). Lawrence Erlbaum Associates.

Choshin, M., & Ghaffari, A. (2017). An investigation of the impact of effective factors on the success of e-commerce in small- and medium-sized companies. *Computers in Human Behavior, 66, 67–74*. doi:10.1016/j.chb.2016.09.026

Chu, S.-C., & Kim, Y. (2011). Determinants of consumer engagement in electronic word-of-mouth (eWOM) in social networking sites. *International Journal of Advertising, 30*(1), 47–75. doi:10.2501/IJA-30-1-047-075

Chung, J. E. (2013). Social interaction in online support groups: Preference for online social interaction over offline social interaction. *Computers in Human Behavior, 29*(4), 1408–1414. doi:10.1016/j.chb.2013.01.019

Cohen, J. (1992). Statistical power analysis. *Current Directions in Psychological Science, 1*(3), 98–101. doi:10.1111/1467-8721.ep10768783

Cropanzano, R., & Mitchell, M. S. (2005). Social exchange theory: An interdisciplinary review. *Journal of Management, 31*(6), 874–900. doi:10.1177/0149206305279602

Desjarlais, M., & Willoughby, T. (2010). A longitudinal study of the relation between adolescent boys and girls’ computer use with friends and friendship quality: Support for the social compensation or the rich-get-richer hypothesis? *Computers in Human Behavior, 26*(5), 896–905. doi:10.1016/j.chb.2010.02.004

Dwivedi, Y. K., Ismagilova, E., Sarker, P., Jeyaraj, A., Jadi, Y., & Hughes, L. (2021). A meta-analytic structural equation model for understanding social commerce adoption. *Information Systems Frontiers, 1–17*. doi:10.1007/s10796-021-10172-2

Ellison, N. B., Steinfield, C., & 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. doi:10.1111/j.1083-6101.2007.00367.x

Emerson, R. M. (1976). Social-exchange theory. *Annual Review of Sociology, 2*(1), 335–362. doi:10.1146/annurev.so.02.080176.002003

Erwin, B. A., Turk, C. L., Heimberg, R. G., Fresco, D. M., & Hantula, D. A. (2004). The Internet: Home to a severe population of individuals with social anxiety disorder? *Journal of Anxiety Disorders, 18*(5), 629–646. doi:10.1016/j.janxdis.2003.08.002 PMID:15275943

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *JMR, Journal of Marketing Research, 18*(1), 39–50. doi:10.1177/002224378101800104

Fresco, D. M., Coles, M. E., Heimberg, R. G., Liebowitz, M. R., Hami, S., Stein, M. B., & Goetz, D. (2001). The Liebowitz social anxiety scale: A comparison of the psychometric properties of self-report and clinician-administered formats. *Psychological Medicine, 31*(6), 1025–1035. doi:10.1017/S0033291701004056 PMID:11513370

Friedrich, T., Schlauderer, S., & Overhage, S. (2021). Some things are just better rich: How social commerce feature richness affects consumers’ buying intention via social factors. *Electronic Markets, 31*(1), 159–180. doi:10.1007/s12525-019-00374-7

Galbraith, P. W. (2010). Akihabara: Conditioning a public” Otaku” image. *Mechademia, 5*(1), 210–230.

Garcia, K. (2018). *The Future of Retail in 2019: Social Commerce Has its Day*. eMarketer. Retrieved 2/24 from https://retail.emarketer.com/article/future-of-retail-2019-social-commerce-has-its-day/5c09dfbf979f107fd484799ae

Goraya, M., Jing, Z., Shareef, M. A., Imran, M., Malik, A., & Akram, M. S. (2021). An investigation of the drivers of social commerce and e-word-of-mouth intentions: Elucidating the role of social commerce in E-business. *Electronic Markets, 31*(1), 181–195. doi:10.1007/s12525-019-00347-w

Gottlieb, B. H., & Bergen, A. E. (2010). Social support concepts and measures. *Journal of Psychosomatic Research, 69*(5), 511–520. doi:10.1016/j.jpsychores.2009.10.001 PMID:20955871

Grieve, R., Kemp, N., Norris, K., & Padgett, C. R. (2017). Push or pull? Unpacking the social compensation hypothesis of Internet use in an educational context. *Computers & Education, 109*, 1–10. doi:10.1016/j.compedu.2017.02.008
Hair, J. F., Anderson, R. E., Babin, B. J., & Black, W. C. (2018). *Multivariate Data Analysis*. Cengage Learning EMEA.

Hair, J. F., & Hult, G. T. M. (2016). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM) (2nd ed.). Sage Publications.

Hair, J. F. Jr, Sarstedt, M., Ringle, C. M., & Gudergan, S. P. (2017). *Advanced Issues in Partial Least Squares Structural Equation Modeling*. SAGE Publications.

Hajli, N., Sims, J., Zadeh, A. H., & Richard, M. O. (2017). A social commerce investigation of the role of trust in a social networking site on purchase intentions. *Journal of Business Research*, 71, 133–141. doi:10.1016/j.jbusres.2016.10.004

Ham, C.-D., Lee, J., Hayes, J. L., & Bae, Y. H. (2019). Exploring sharing behaviors across social media platforms. *International Journal of Market Research*, 61(2), 157–177. doi:10.1177/1470785318782790

Heeren, A., Mogoșe, C., Philippot, P., & McNally, R. J. (2015). Attention bias modification for social anxiety: A systematic review and meta-analysis. *Clinical Psychology Review*, 40, 76–90. doi:10.1016/j.cpr.2015.06.001 PMID:26080314

Henseler, J. (2012). PLS-MGA: A non-parametric approach to partial least squares-based multi-group analysis. In Challenges at the interface of data analysis, computer science, and optimization (pp. 495-501). Springer. doi:10.1007/978-3-642-24466-7_50

Henseler, J. (2018). Partial least squares path modeling: Quo vadis? *Quality & Quantity*, 52(1), 1–8. doi:10.1007/s11135-018-0689-6

Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. *International Marketing Review*, 33(3), 405–431. doi:10.1108/IMR-09-2014-0304

Horng, S.-M. (2016). A study of active and passive user participation in virtual communities. *Journal of Electronic Commerce Research*, 17(4), 289–311.

Horng, S.-M., & Wu, C.-L. (2020). How behaviors on social network sites and online social capital influence social commerce intentions. *Information & Management*, 57(2), 103176. doi:10.1016/j.im.2019.103176

Huang, Z., & Benyoucef, M. (2013). From e-commerce to social commerce: A close look at design features. *Electronic Commerce Research and Applications*, 12(4), 246–259. doi:10.1016/j.elerap.2012.12.003

Huang, Z., & Benyoucef, M. (2015). User preferences of social features on social commerce websites: An empirical study. *Technological Forecasting and Social Change*, 95, 57–72. doi:10.1016/j.techfore.2014.03.005

Indian, M., & Grieve, R. (2014). When Facebook is easier than face-to-face: Social support derived from Facebook in socially anxious individuals. *Personality and Individual Differences*, 59, 102–106. doi:10.1016/j.paid.2013.11.016

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, 53(1), 59–68. doi:10.1016/j.bushor.2009.09.003

Kazdin, A. E. (2000). *Encyclopedia of Psychology* (Vol. 2). American Psychological Association Washington.

Kim, S., Kandampully, J., & Bilgihan, A. (2018). The influence of eWOM communications: An application of online social network framework. *Computers in Human Behavior*, 80, 243–254. doi:10.1016/j.chb.2017.11.015

Ko, H.-C. (2018). Social desire or commercial desire? The factors driving social sharing and shopping intentions on social commerce platforms. *Electronic Commerce Research and Applications*, 28, 1–15. doi:10.1016/j.elerap.2017.12.011

Kollock, P., & Smith, M. (2002). Communities in cyberspace. In *Communities in cyberspace* (pp. 13–34). Routledge. doi:10.4324/9780203194959-9

Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Helgeson, V., & Crawford, A. (2002). Internet paradox revisited. *The Journal of Social Issues*, 58(1), 49–74. doi:10.1111/1540-4560.00248
Laghi, F., Schneider, B. H., Vitoroulis, I., Coplan, R. J., Baiocco, R., Amichai-Hamburger, Y., Hudek, N., Koszycki, D., Miller, S., & Flament, M. (2013). Knowing when not to use the Internet: Shyness and adolescents’ on-line and off-line interactions with friends. *Computers in Human Behavior, 29*(1), 51–57. doi:10.1016/j.chb.2012.07.015

Leary, M. R. (1983). Social Anxiousness: The construct and its measurement. *Journal of Personality Assessment, 47*(1), 66–75. doi:10.1207/s15327752jpa4701_8 PMID:6834234

Lee, B. W., & Stapinski, L. A. (2012). Seeking safety on the internet: Relationship between social anxiety and problematic internet use. *Journal of Anxiety Disorders, 26*(1), 197–205. doi:10.1016/j.janxdis.2011.11.001 PMID:22169053

Leung, C. K., Jiang, F., Poon, T. W., & Crevier, P.-É. (2018). Big data analytics of social network data: who cares most about you on Facebook? In *Highlighting the Importance of Big Data Management and Analysis for Various Applications* (pp. 1–15). Springer. doi:10.1007/978-3-319-60255-4_1

Li, C.-Y. (2019). How social commerce constructs influence customers’ social shopping intention? An empirical study of a social commerce website. *Technological Forecasting and Social Change, 144*, 282–294. doi:10.1016/j.techfore.2017.11.026

Li, C.-Y., & Ku, Y.-C. (2018). The power of a thumbs-up: Will e-commerce switch to social commerce? *Information & Management, 55*(3), 340–357. doi:10.1016/j.im.2017.09.001

Li, M., Xu, D., Ma, G., & Guo, Q. (2021). Strong tie or weak tie? Exploring the impact of group-formation gamification mechanisms on user emotional anxiety in social commerce. *Behaviour & Information Technology, 1–30*. doi:10.1080/0144929X.2021.1917661

Li, X., Wu, C., & Mai, F. (2019). The effect of online reviews on product sales: A joint sentiment-topic analysis. *Information & Management, 56*(2), 172–184. doi:10.1016/j.im.2018.04.007

Liang, T.-P., Ho, Y.-T., Li, Y.-W., & Turban, E. (2011). What drives social commerce: The role of social support and relationship quality. *International Journal of Electronic Commerce, 16*(2), 69–90. doi:10.2753/JEC1086-4415160204

Liebowitz, M. R., Gorman, J. M., Fyer, A. J., & Klein, D. F. (1985). Social phobia: Review of a neglected anxiety disorder. *Archives of General Psychiatry, 42*(7), 729–736. doi:10.1001/archpsyc.1985.01790300097013 PMID:2861796

Lin, J., Luo, Z., Cheng, X., & Li, L. (2019). Understanding the interplay of social commerce affordances and swift guanxi: An empirical study. *Information & Management, 56*(2), 213–224. doi:10.1016/j.im.2018.05.009

López, M., & Sicilia, M. (2014). eWOM as source of influence: The impact of participation in eWOM and perceived source trustworthiness on decision making. *Journal of Interactive Advertising, 14*(2), 86–97. doi:10.1080/15252019.2014.944288

Madell, D., & Muncer, S. (2006). Internet Communication: An Activity that Appeals to Shy and Socially Phobic People? *Cyberpsychology & Behavior, 9*(5), 618–622. doi:10.1089/cpb.2006.9.618 PMID:17034331

Manago, A. M., Graham, M. B., Greenfield, P. M., & Salimkhan, G. (2008). Self-presentation and gender on MySpace. *Journal of Applied Developmental Psychology, 29*(6), 446–458. doi:10.1016/j.appdev.2008.07.001

Matthews, L. (2017). Applying Multigroup analysis in PLS-SEM: A step-by-step process. In H. Latan & R. Noonan (Eds.), *Partial Least Squares Path Modeling: Basic Concepts, Methodological Issues and Applications* (pp. 219–243). Springer International Publishing. doi:10.1007/978-3-319-64069-3_10

McKenna, K. Y. A., Green, A. S., & Gleason, M. E. J. (2002). Relationship formation on the internet: What’s the big attraction? *Journal of Social Issues, 58*(1), 9-31.

MHA. (2020). *Number of People Reporting Anxiety and Depression Nationwide since Start of Pandemic Hits All-Time High in September, Hitting Young People Hardest*. Retrieved March 15, 2022 from: https://www.mhanational.org/number-people-reporting-anxiety-and-depression-nationwide-start-pandemic-hits-all-time-high

Mühlberger, A., Wieser, M. J., & Pauli, P. (2008). Visual attention during virtual social situations depends on social anxiety. *Cyberpsychology & Behavior, 11*(4), 425–430. doi:10.1089/cpb.2007.0084 PMID:18721090
O’Keeffe, G. S., & Clarke-Pearson, K. (2011). The impact of social media on children, adolescents, and families. *Pediatrics, 127*(4), 800–804. doi:10.1542/peds.2011-0054 PMID:21444588

Oh, H. J., Ozkaya, E., & LaRose, R. (2014). How does online social networking enhance life satisfaction? The relationships among online supportive interaction, affect, perceived social support, sense of community, and life satisfaction. *Computers in Human Behavior, 30*, 69–78. doi:10.1016/j.chb.2013.07.053

Peter, J., & Valkenburg, P. M. (2006). Research note: Individual differences in perceptions of Internet communication. *European Journal of Communication, 21*(2), 213–226. doi:10.1177/0267323105064046

Petzold, M. B., Bendau, A., Plag, J., Pyrkosch, L., Mascarel Maricic, L., Betzler, F., Rogoll, J., Große, J., & Ströhle, A. (2020). Risk, resilience, psychological distress, and anxiety at the beginning of the COVID-19 pandemic in Germany. *Brain and Behavior, 10*(9), e01745. doi:10.1002/brb3.1745 PMID:32633464

Pierce, T. (2009). Social anxiety and technology: Face-to-face communication versus technological communication among teens. *Computers in Human Behavior, 25*(6), 1367–1372. doi:10.1016/j.chb.2009.06.003

Petzold, M. B., Bendau, A., Plag, J., Pyrkosch, L., Mascarel Maricic, L., Betzler, F., Rogoll, J., Große, J., & Ströhle, A. (2020). Risk, resilience, psychological distress, and anxiety at the beginning of the COVID-19 pandemic in Germany. *Brain and Behavior, 10*(9), e01745. doi:10.1002/brb3.1745 PMID:32633464

Poley, M. E. M., & Luo, S. (2012). Social compensation or rich-get-richer? The role of social competence in college students’ use of the Internet to find a partner. *Computers in Human Behavior, 28*(2), 414–419. doi:10.1016/j.chb.2011.10.012

Porter, E., & Chambless, D. L. (2017). Social Anxiety and Social Support in Romantic Relationships. *Behavior Therapy, 48*(3), 335–348. doi:10.1016/j.beth.2016.12.002 PMID:28390497

Primack, B. A., Shensa, A., Escobar-Viera, C. G., Barrett, E. L., Sidani, J. E., Colditz, J. B., & James, A. E. (2017). Use of multiple social media platforms and symptoms of depression and anxiety: A nationally-representative study among U.S. young adults. *Computers in Human Behavior, 69*, 1–9. doi:10.1016/j.chb.2016.11.013

Prizant-Passal, S., Shechner, T., & Aderka, I. M. (2016). Social anxiety and internet use – A meta-analysis: What do we know? What are we missing? *Computers in Human Behavior, 62*, 221–229. doi:10.1016/j.chb.2016.04.003

Rodebaugh, T. L., Holaway, R. M., & Heimberg, R. G. (2004). The treatment of social anxiety disorder. *Clinical Psychology Review, 24*(7), 883–908. doi:10.1016/j.cpr.2004.07.007 PMID:15501560

Rouibah, K., Al-Qirim, N., Hwang, Y., & Pouri, S. G. (2021). The Determinants of eWoM in Social Commerce: The Role of Perceived Value, Perceived Enjoyment, Trust, Risks, and Satisfaction. *Journal of Global Information Management, 29*(3), 75–102. doi:10.4018/JGIM.2021050104

Selfhout, M. H. W., Branje, S. J. T., Delsing, M., Ter Bogt, T. F. M., & Meeus, W. H. J. (2009). Different types of Internet use, depression, and social anxiety: The role of perceived friendship quality. *Journal of Adolescence, 32*(4), 819–833. doi:10.1016/j.adolescence.2008.10.011 PMID:19027940

Shalom, J. G., Israeli, H., Markovitzky, O., & Lipsitz, J. D. (2015). Social anxiety and physiological arousal during computer mediated vs. face to face communication. *Computers in Human Behavior, 44*, 202–208. doi:10.1016/j.chb.2014.11.056

Sheikh, Z., Yezheng, L., Islam, T., Hameed, Z., & Khan, I. U. (2019). Impact of social commerce constructs and social support on social commerce intentions. *Information Technology & People, 32*(1), 68–93. doi:10.1108/ITP-04-2018-0195

Shen, X.-L., Li, Y.-J., Sun, Y., Chen, Z., & Wang, F. (2019). Understanding the role of technology attractiveness in promoting social commerce engagement: Moderating effect of personal interest. *Information & Management, 56*(2), 294–305. doi:10.1016/j.im.2018.09.006

Smith, C. (2015). *By the Numbers: 200 plus Amazing Facebook User Statistics (February 2015)*. DMR Digital Marketing Stats/Strategy/Gadgets. Retrieved 04/10 from https://expandedramblings.com/index.php/by-the-numbers-17-amazing-facebook-stats/3/

Solovida, G. T., & Latan, H. (2017). *Linking environmental strategy to environmental performance*. Sustainability Accounting, Management and Policy Journal. doi:10.1108/SAMPJ-08-2016-0046
Steimer, T. (2002). The biology of fear- and anxiety-related behaviors. *Dialogues in Clinical Neuroscience, 4*(3), 231–249. doi:10.31887/DCNS.2002.4.3/tsteimer PMID:22033741

Stein, M. B., & Stein, D. J. (2008). Social anxiety disorder. *Lancet, 371*(9618), 1115–1125. doi:10.1016/S0140-6736(08)60488-2 PMID:18374843

Stevens, S. B., & Morris, T. L. (2007). College dating and social anxiety: Using the internet as a means of connecting to others. *Cyberpsychology & Behavior, 10*(5), 680–688. doi:10.1089/cpb.2007.9970 PMID:17927536

Valenzuela, S., Park, N., & Kee, K. F. (2009). Is there social capital in a social network site?: Facebook use and college students’ life satisfaction, trust, and participation. *Journal of Computer-Mediated Communication, 14*(4), 875–901. doi:10.1111/j.1083-6101.2009.01474.x

Vannucci, A., Flannery, K. M., & Ohannessian, C. M. (2017). Social media use and anxiety in emerging adults. *Journal of Affective Disorders, 207*, 163–166. doi:10.1016/j.jad.2016.08.040 PMID:27723539

Wang, J.-L., Jackson, L. A., & Zhang, D.-J. (2011). The mediator role of self-disclosure and moderator roles of gender and social anxiety in the relationship between Chinese adolescents’ online communication and their real-world social relationships. *Computers in Human Behavior, 27*(6), 2161–2168. doi:10.1016/j.chb.2011.06.010

Weidman, A. C., Fernandez, K. C., Levinson, C. A., Augustine, A. A., Larsen, R. J., & Rodebaugh, T. L. (2012). Compensatory internet use among individuals higher in social anxiety and its implications for well-being. *Personality and Individual Differences, 53*(3), 191–195. doi:10.1016/j.paid.2012.03.003 PMID:22791928

Wetzel, M., Gaby, O.-S., & Oppen, C. (2009). Using pls path modeling for assessing hierarchical construct models: Guidelines and empirical illustration. *Management Information Systems Quarterly, 33*(1), 177–195. doi:10.2307/20650284

Wieser, M. J., Pauli, P., Grosseibl, M., Molzow, I., & Mühlberger, A. (2010). Virtual social interactions in social anxiety-the impact of sex, gaze, and interpersonal distance. *Cyberpsychology, Behavior, and Social Networking, 13*(5), 547–554. doi:10.1089/cyber.2009.0432 PMID:20950179

Wright, M. (2018). Cyberbullying victimization through social networking sites and adjustment difficulties: The role of parental mediation. *Journal of the Association for Information Systems, 19*(2), 113–123. doi:10.17705/jais.100486

Yee, N., Bailenson, J. N., & Ducheneaut, N. (2009). The proteus effect: implications of transformed digital self-representation on online and offline behavior. *Communication Research, 36*(2), 285–312. doi:10.1177/0093650208330254

Yinghua, Y. E., & Lin, L. I. N. (2015). Examining relations between locus of control, loneliness, subjective well-being, and preference for online social interaction. *Psychological Reports, 116*(1), 164–175. doi:10.2466/07.09.PR0.116k14w3 PMID:25621672

York, A. (2017). *Social Media Demographics to Inform a Better Segmentation Strategy*. sproutsocial.com. Retrieved 03 from https://sproutsocial.com/insights/new-social-media-demographics/

Zhang, H., Lu, Y., Gupta, S., & Zhao, L. (2014). What motivates customers to participate in social commerce? The impact of technological environments and virtual customer experiences. *Information & Management, 51*(8), 1017–1030. doi:10.1016/j.im.2014.07.005

Zhang, H., Wang, Z., Chen, S., & Guo, C. (2019). Product recommendation in online social networking communities: An empirical study of antecedents and a mediator. *Information & Management, 56*(2), 185–195. doi:10.1016/j.im.2018.05.001

Zhang, K. Z. K., & Benyoucef, M. (2016). Consumer behavior in social commerce: A literature review. *Decision Support Systems, 86*, 95–108. doi:10.1016/j.dss.2016.04.001

Zheng, L., Miao, M., Lim, J., Li, M., Nie, S., & Zhang, X. (2020). Is Lockdown Bad for Social Anxiety in COVID-19 Regions?: A National Study in The SOR Perspective. *International Journal of Environmental Research and Public Health, 17*(12), 4561. doi:10.3390/ijerph17124561 PMID:32599911

Zsido, A. N., Arato, N., Lang, A., Labadi, B., Stecina, D., & Bandi, S. A. (2021). The role of maladaptive cognitive emotion regulation strategies and social anxiety in problematic smartphone and social media use. *Personality and Individual Differences, 173*, 110647. doi:10.1016/j.paid.2021.110647
APPENDIX

Table 6. Liebowitz's Social Anxiety Scale

| Item                                                                 | Fear | Avoidance |
|----------------------------------------------------------------------|------|-----------|
| 1. Telephoning in public                                           |      |           |
| 2. Participating in small groups                                   |      |           |
| 3. Eating in public places                                         |      |           |
| 4. Drinking with others in public places                           |      |           |
| 5. Talking to people in authority                                  |      |           |
| 6. Acting, performing or giving a talk in front of an audience      |      |           |
| 7. Going to a party                                                |      |           |
| 8. Working while being observed                                    |      |           |
| 9. Writing while being observed                                     |      |           |
| 10. Calling someone you don't know very well                       |      |           |
| 11. Talking with people you don't know very well                   |      |           |
| 12. Meeting strangers                                              |      |           |
| 13. Using a public restroom                                        |      |           |
| 14. Entering a room when others are already seated                 |      |           |
| 15. Being the center of attention                                  |      |           |
| 16. Speaking up at a meeting                                       |      |           |
| 17. Taking a test                                                  |      |           |
| 18. Expressing a disagreement or disapproval to people you don't know very well |      |           |
| 19. Looking at people you don't know very well in the eyes         |      |           |
| 20. Giving a report to a group                                     |      |           |
| 21. Trying to pick up someone                                     |      |           |
| 22. Returning goods to a store                                     |      |           |
| 23. Giving a party                                                 |      |           |
| 24. Resisting a high-pressure salesperson                          |      |           |

| Fresco et al., 2001; Liebowitz et al., 1983 |

Chih-Lun Wu received his Ph.D. in Business Administration from National Chengchi University in Taiwan and received a Distinguished Doctoral Dissertation of TOPCO Thesis Award hosted by Taiwan Management Association. He is also a recipient of a grant for Postdoctoral Research Abroad Program from Taiwan. His current research interests include online user behavior in e-commerce and e-supply chain management. He has presented his research at major conferences such as the Pacific Asia Conference on Information Systems (PACIS) and published several papers in Information & Management, Behaviour and Information Technology, Computer Communications, Journal of E-Business, and other journals.

Shwu-Min Horng received a Ph.D. degree in Industrial Engineering from Arizona State University, Tempe, AZ. Prior to the academic services, he had several years of working experience in supply chain management. He is currently a Professor in the Department of Business Administration at National Chengchi University, Taiwan. His research interests include electronic commerce, supply chain management, and applications of operations research.