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A Meta-Analytic Structural Equation Model for Understanding Social Commerce Adoption

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Abstract
Social commerce (s-commerce) has gained prominence with advances in social media and social networking technologies over the last decade. Prior research has employed diverse theoretical perspectives to understand and explain consumer behavior within s-commerce but has also produced inconsistent results. This study integrates different theoretical perspectives including trust, social support, and social presence. The research portrays an integrated research model involving factors that impact behavioral intention and use behavior of s-commerce consumers whilst synthesizing prior empirical findings. A meta-analytic structural equation modeling (MASEM) method was used to synthesize 189 findings reported in 68 s-commerce studies and to analyze the structural model. Our findings show that trust and informational support have positive effects on behavioral intention while trust and emotional support have positive effects on use behavior. Furthermore, our findings highlight that behavioral intention influences use behavior and mediates the effect of trust and informational support on use behavior. The implications for research and practice are discussed in detail.

Keywords S-commerce · Behavioral intention · Use behavior · MASEM

1 Introduction

The development of the internet and e-commerce has made the purchasing of goods and services online become ubiquitous for many people. The variety of devices with internet connections, makes it possible to buy products almost anywhere (Chen et al., 2021; Coppola, 2020; Dwivedi et al., 2021; Krishen et al., 2021). The number of digital buyers is increasing significantly and is expected to grow to 2.14 billion people worldwide in 2021 (Statista, 2020). It is estimated that there are currently 4.33 billion social media users globally, which accounts for almost 55% of the global population—Facebook has 2.8 billion global users, YouTube has over 2.2 billion users, Instagram with 1.2 billion users, and TikTok with 732 million global active users (Kemp, 2021).

The increased popularity of social media and social networking sites (SNS) has led to a new stream of electronic commerce, termed as social commerce (s-commerce) (Ali et al., 2020). S-commerce is defined as a "socially-driven interaction process pertinent to purchasing a product or service using quality of social media" (Aladwani, 2018, p. 2). There are key features that distinguish s-commerce from e-commerce, such as forums and communities, ratings and reviews, as well as recommendations and referrals (Chen et al., 2017). S-commerce can be considered as a new stream of e-commerce, where users are able to participate, communicate,

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interact and purchase or sell products and services (Abed et al., 2015; Ali et al., 2020; Hajli et al., 2014). S-commerce has generated significant economic benefits and changed the way consumers gather and process information. S-commerce features within e-commerce websites have allowed two-way communications between users, leading to improved shopping experiences allowing users to share their knowledge and interaction across their social networks (Hajli, 2014, 2020).

S-commerce has attracted considerable attention from marketing and information systems scholars over the last decade (Sarker, Hughe, et al., 2020a). A number of empirical studies have examined behavioral intention and use behavior in s-commerce (e.g. Bugshan & Attar, 2020; Molinillo et al., 2018; Nadeem et al., 2017; Zhang et al., 2014) using various theoretical foundations such as Stimulus-Organism-Response model, technology acceptance model, trust transfer theory, social support theory, and social exchange theory (Sarker et al., 2019; Sarker, Rana, et al., 2020c). While these theories are valuable in explaining consumer behavior, they are somewhat limited in explaining s-commerce behavior. Prior research has highlighted the lack of a theoretical model which can help to analyze the major factors affecting user behavior from interacting with s-commerce (Al-Dwairi, 2017). This study asserts that an integrated theoretical model combining multiple perspectives can help advance the understanding of factors affecting s-commerce consumer behavior.

Prior studies have reported contradictory results about the impact of various factors on consumer behavior within s-commerce settings. For example, Bugshan and Attar (2020) showed that trust has a significant impact on behavioral intention while Nadeem et al. (2017) found that impact is not significant. Zhang et al. (2014) affirmed that social presence significantly affects consumer behavioral intention while Molinillo et al. (2018) found the opposite effect. While extant studies provide valuable insights into factors influencing behavioral intention and use behavior within s-commerce contexts, the literature seems to omit any meaningful generalization of these findings. Prior research has attempted to synthesize existing findings in the context of s-commerce (e.g., 2020a, b, c; Altinişik & Yildirim, 2017; Busalim, 2016; Han et al., 2018; Mou & Benyoucef, 2021; Sarker et al., 2019; Zhang & Benyoucef, 2016). However, such studies are generally limited to reviewing theories and models, highlighting limitations, and presenting future research directions. Sarker, Hughes, and Dwivedi (2020b) and Mou and Benyoucef (2021) provide considerable insights into the factors related to behavioral intention within s-commerce. However, detailed investigations into the inter-relationships between factors affecting behavioral intention and use behavior seem to be missing from the wider literature.

Therefore, this research aims to present and test an integrated theoretical model which examines factors affecting behavioral intention and use behavior of consumers in s-commerce. A combination of theories can provide a deeper understanding of consumer behavior in the context of s-commerce. In doing so, this research synthesizes and reconciles conflicting findings on factors affecting behavioral intention and use behavior using meta-analytic structural equation modeling (MASEM) methods (Dwivedi et al., 2019; Jeyaraj & Dwivedi, 2020). This research thus addresses the fragmented nature of theoretical advances, inconsistency within existing studies, and the lack of conclusive results related to different theoretical concepts and relationships within s-commerce. We assert that such an integrated view that also synthesizes extant knowledge and facilitates a better understanding of the predictors of consumer behavior within s-commerce. The insights related to s-commerce consumer behavior can offer direct benefit to organizations and demonstrably impact sales volumes.

The rest of the paper is structured as follows. Section 2 provides the theoretical background of s-commerce, followed by Section 3 that describes the research model and hypothesis development. Section 4 explains the research methodology applied within the current study. Section 5 presents the results of the meta-analysis, followed by the discussion in section 6. The paper is concluded in section 7.

2 Theoretical Background

2.1 S-Commerce

The advance and development of web 2.0 applications and information and communication technologies (ICT) has directly contributed to the development of s-commerce (Kim & Park, 2013). S-commerce brings social elements, such as attention, sharing, communication, discussion, and interaction to the e-commerce transaction process (Lee & Chen, 2020). Interactions in the context of s-commerce can also be initiated by consumers that in turn can recommend products/services to other users on s-commerce platforms (Lee & Chen, 2020). S-commerce can be considered as a combination of commercial and social activities (Liang & Turban, 2011; Lu, Fan, & Zhou, 2016a; Yadav et al., 2013). There are several different types of s-commerce channels such as social network-based platforms (e.g. marketplace of Facebook), recommendation-based marketplaces (e.g. Yelp), e-commerce marketplaces integrated with added social applications (e.g. Amazon, eBay), and group buying sites (e.g. Groupon) to name a few (Lu, Zeng, & Fan, 2016b). A number of studies have investigated consumer behavior and interaction with s-commerce. Researchers have examined factors affecting behavioral intention to use s-commerce (Abou-Elgheit, 2019; Al-Tit et al., 2020), use behavior (Akman & Mishra, 2017; Chen et al., 2021; Sheikh et al., 2017; Xu et al., 2021), how trust is built (Leong et al.,

2020), sense of community (Zhou, 2019), attitude toward s-commerce sites (Pacheco & Jaipaul-O'Garro, 2020), intention to repost (Wang et al., 2019), eWOM sharing intention (Yang, 2019) and trust relating to sellers (Zhao et al., 2019).

2.2 Theories in S-Commerce Research

In order to understand consumer behavior in the context of s-commerce, previous studies have adopted different theories and models. Trust-based theory, social presence theory and social support theory are the more commonly employed theories to explain intention and use related to s-commerce.

2.2.1 Trust-Based Theory

Trust plays an important role in the online environment, particularly for commercial transactions. Online transactions can involve a high degree of risk and uncertainty, therefore, trust is considered a key building block for long-term relationships within online contexts (Lal, 2017). Trust is considered an essential factor in the context of e-commerce and s-commerce (Al-Adwan & Kokash, 2019; Slade et al., 2014). A number of s-commerce studies focus on trust as an important factor impacting consumer behavior (Abou-Elgheit, 2019; Al-Adwan & Kokash, 2019; Al-Dwairi, 2017; Bugshan & Attar, 2020; Chen & Shen, 2015; Cheng et al., 2019; Hajli, 2015; Hajli, Sims, et al., 2017a; Hajli, Wang, et al., 2017b; Leong et al., 2020; Lin et al., 2018, 2019; Lu, Fan, & Zhou, 2016a; Lu, Zeng, & Fan, 2016b; Rahman et al., 2020; Sharma et al., 2019; Zhao et al., 2019). For instance, Abou-Elgheit (2019) applied a trust-based consumer decision-making model (TBCDM) and also included social and cultural dimensions (social approval, uncertainty avoidance, individualism, and benevolence-based trust) to investigate the behavior of Egyptian electronic shoppers. TBCDM is based on the theory of reasoned action (Ajzen & Fishbein, 1980), social impact theory (Latane, 1981), commitment-trust theory (Morgan & Hunt, 1994), and model of trust (Mayer et al., 1995). TBCDM provides insights on how consumer trust, perceived risk, and perceived benefit affect consumer behavioral intentions to buy online (Abou-Elgheit, 2019). The study by Farivar et al. (2017) developed trust transfer theory along with risk and habit to examine initial intention and continuous intention of s-commerce consumers.

2.2.2 Social Presence Theory

Social presence theory (SPT) focuses on the ability of a communication medium to transmit social cues (Short et al., 1976). According to SPT, communication is more effective when the communication medium has social presence. Social presence is defined as an individual's belief that there is a sense of human warmth, human contact and personalness when using s-commerce platforms (Chen et al., 2021). A number of studies have applied this theory to investigate the adoption of s-commerce (Al-Adwan & Kokash, 2019; Friedrich et al., 2019; Hassan et al., 2018; Leong et al., 2020; Lu, Fan, & Zhou, 2016a; Lu, Zeng, & Fan, 2016b). Lu, Zeng, and Fan (2016b) considered perceived social presence as a two-dimensional construct including the perceived social presence of the marketplace and perceived social presence of others, both of which influence consumer behavior in the context of s-commerce.

2.2.3 Social Support Theory

Social support theory (SST) examines ways in which social network characteristics influence an individual's ability to manage life events (Fan et al., 2019; Maier et al., 2015). Social support is a psychological term (Lee & Chen, 2020), defined as "the social resources that persons perceive to be available or that are actually provided to them by non-professionals in the context of both formal support groups and information helping relationships" (Gottlieb & Bergen, 2010; p. 512). The concept of social support has been investigated within a number of studies particularly in the field of psychology and sociology, focusing on both types of social support tangible and intangible. Within the s-commerce environment, intangible social support plays an important role in purchasing intention and enhancing relationships (Rashid et al., 2020; Sheikh et al., 2019). Several studies have applied SST to explore individual's behavior in the context of s-commerce (Attar et al., 2020; Chen & Shen, 2015; Fan et al., 2019; Hajli, 2014; Hajli & Sims, 2015; Leong et al., 2020; Liang et al., 2011; Lin et al., 2018). Other studies found that informational and emotional support influence consumer behavior (Bhat & Singh, 2018; Lal, 2017; Makmor et al., 2018; Molinillo et al., 2018). Studies have also investigated roles of other constructs such as relationship quality and perceived value in order to understand continuance participation behavior (Lin et al., 2018; Shanmugam et al., 2015).

3 Research Model

While the theories identified earlier offer useful insights, they are often limited in explaining consumer behavior in the context of s-commerce. Consequently, our study portrays an integrated research model that combines perspectives from trust, social support, and social presence. The proposed research model is illustrated by Fig. 1 and Table 1.

3.1 Trust

Trust is defined as "belief that one can rely upon a promise made by another and that the other, in unforeseen

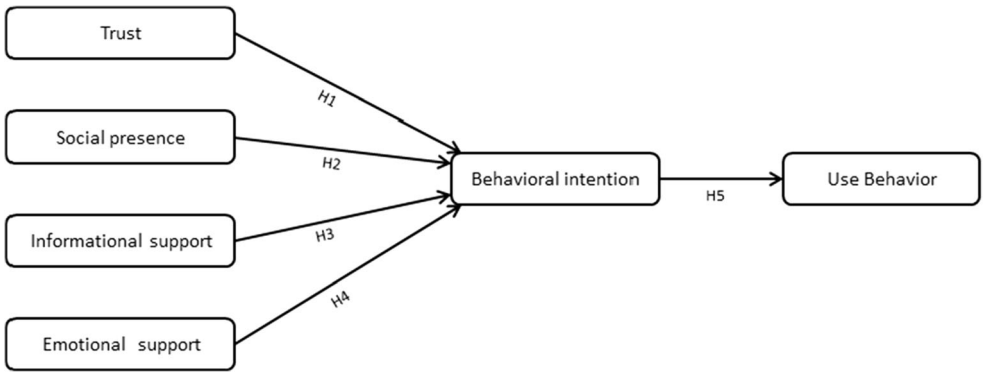

Fig. 1 Research Model

circumstances, will act toward oneself with goodwill and in a benign fashion" (Suh & Han, 2003, p. 137). Trust plays an important role in internet behavior (Odusanya et al., 2020; Zhou et al., 2016). As perceived risk and uncertainty in the online environment is high, users can be suspicious about security of online commerce activities (Mulero & Adeyeye, 2013; Slade et al., 2014). Within the context of s-commerce, trust consists of trust in technology and trust in people/company (Sharma et al., 2019). Thus, s-commerce trust refers to the subjective beliefs held by consumers that other individuals are trustworthy and that the technology is reliable to effectively engage in s-commerce activities (Lin et al., 2019). Mistrust in technology will lead to a reluctance in engagement in any social interactions or purchase behavior. Consumers need to be able to trust the specific platform or website to positively impact the purchase decision (Chen & Shen, 2015). Thus, a higher perception of trust in s-commerce will result in consumers being more comfortable with the requests and interactions from peers and sellers, resulting in an increase in the chance of purchase (Al-Adwan, 2019; Meilatinova, 2021). Other studies hypothesized trust to influence consumer buying intention (Akman & Mishra, 2017; Aladwani, 2018; Hajli et al., 2017a, b; Kim & Park, 2013; Makmor et al., 2018). Based on the above discussion the following is hypothesized:

H1: *Trust has a significant positive influence on behavioral intention to use s-commerce.*

Table 1 presents the factors in our research model, definitions, and representative studies from prior literature

Construct	Definition	References
Trust	The belief that one can rely upon a promise made by another and that the other, in unforeseen circumstances, will act toward oneself with goodwill and in a benign fashion.	Al-Adwan & Kokash, 2019; Al-Adwan, 2019; Al-Tit et al., 2020; Bugshan & Attar, 2020; Cheng et al., 2019; Dabbous et al., 2020; Fan et al., 2019; Ghahtarani et al., 2020; Shekhar & Jaidev, 2020; Um, 2019; Zhao et al., 2019
Social presence	The belief that there is a sense of human warmth, human contact and personalness when using s-commerce platforms.	Chen et al., 2021; Friedrich et al., 2019; Hassan et al., 2018; Leong et al., 2020; Li, 2019; Rahman et al., 2020; Rashid et al., 2020; Sharma et al., 2019; Sun et al., 2019; Um, 2019
Informational support	The perceived sense of the information assistance received from the interactions in the s-commerce environment.	Al-Tit et al., 2020; Fan et al., 2019; Lin et al., 2018; Lin et al., 2019; Molinillo et al., 2018; Ooi et al., 2018; Riaz et al., 2020; Sheikh et al., 2019; Yusuf et al., 2018; Zhao et al., 2019; Zhou, 2019
Emotional support	The perceived sense of the emotional concerns received from the interactions in s-commerce environment.	Al-Tit et al., 2020; Handarkho, 2020a; Hossain et al., 2020; Hu et al., 2019; Li & Ku, 2018; Liang et al., 2011; Lin et al., 2018; Molinillo et al., 2018; Ooi et al., 2018; Riaz et al., 2020

3.2 Social Presence

Social presence is defined as "a representation of the degree to which the medium of communication makes an individual aware of the others on the communication process with the communication medium also facilitating social interaction" (Al-Adwan & Kokash, 2019, p. 22; Gefen & Straub, 2003). It provides access to social knowledge and rich information, which can aid users to make more informed purchase decisions (Gefen & Straub, 2003). Prior research has shown that online shopping can be affected by the absence of social presence which is caused by the lack of human interaction (Botha & Reyneke, 2016). Social presence is considered a key feature

that can help users to avoid uncertainty and decrease perceived risks. Gefen and Straub (2004) proposed that social presence has a positive effect on purchase intention within online platforms by increasing aspects such as predictability, benevolence, integrity, and ability. Prior studies have shown social presence to significantly influence behavioral intention (Aladwani, 2018; Bhat & Singh, 2018; Hajli et al., 2017a, b; Zhang et al., 2014). Thus, based on the previous discussion the following is hypothesized:

H2: *Social presence has a significant positive influence on behavioral intention to use s-commerce.*

3.3 Social Support

Social support is defined as the way an individual perceives physical and psychological help, responsiveness, and care from other people in the same group (Bai et al., 2015). Studies distinguish two dimensions of social support in the s-commerce context, namely informational support and emotional support (Al-Tit et al., 2020).

Informational support refers to the provision of helpful information and recommendations to other individuals. Informational support aims to assist individuals in purchase decision-making (Al-Tit et al., 2020). Nowadays, a growing number of s-commerce users not only seek information online, but also generating content and support the members of communities in the decision-making process (Riaz et al., 2020). Informational support is available on different s-commerce platforms and can influence shopping intentions of consumers. Users of s-commerce rely heavily on the knowledge and information provided by other users (Bai et al., 2015). Liang et al. (2011) found that informational support has a positive impact on s-commerce intention and helped consumers to make a favorable and well-informed buying decision. Informational support can influence behavioral intention of consumers to purchase using s-commerce site (Bhat & Singh, 2018; Lal, 2017; Makmor et al., 2018; Molinillo et al., 2018). Thus, the following hypothesis is proposed:

H3: *Informational support has a significant positive influence on behavioral intention to use s-commerce.*

Emotional support represents another dimension of social support (Al-Tit et al., 2020) and contributes to the feelings of the individual (Chen & Shen, 2015). Emotional support includes elements such as a friend's encouragement, empathy and understanding, concern, and love (Liang et al., 2011). The recipient of the emotional support feels valued. Members can feel comfortable and seek help from other members of the online community (Riaz et al., 2020). Emotional support helps individuals to connect with other members in the online community to make well-informed purchase decisions (Riaz et al., 2020). Molinillo et al. (2018) found that consumers have greater s-commerce intentions when they feel that they are emotionally supported by other consumers. Handarkho (2020a) argues that individuals tend to be excited to use s-commerce platforms when they feel part of the community. As a result, the following relationship is hypothesized:

H4: *Emotional support has a significant positive influence on behavioral intention to use s-commerce.*

3.4 Behavioral Intention

Behavioral intention refers to the propensity of users to engage in a certain behavior (Ajzen, 2002). According to Ajzen (1991), use behavior of consumers can be predicted from behavioral intention. The effect of behavioral intention on technology use is well established within the literature (Chopdar et al., 2018; Dwivedi et al., 2019; Venkatesh et al., 2012). A limited number of studies have investigated the impact of behavioral intention on use behavior in the context of s-commerce (Akman & Mishra, 2017; Al-Adwan, 2019; Chen et al., 2021; Hashim et al., 2015; Lin & Wu, 2015; Sheikh et al., 2019; Shin, 2013; Yeon et al., 2019). For example, Sheikh et al. (2019) found that s-commerce intentions have a significant effect on use behavior by using data collected from 343 SNS users from Pakistan. Thus, based on the above discussion the following hypothesis is proposed:

H5: *Behavioral Intention has a significant positive influence on use behavior in s-commerce.*

4 Research Methods

MASEM methods were employed in this study to examine the research model (Jeyaraj & Dwivedi, 2020). MASEM involves multiple steps such as the identification and coding of prior studies, conduct of quantitative meta-analysis to obtain the matrix of correlation effect sizes (Dwivedi et al., 2019; Hunter & Schmidt, 1990), and analysis using SEM (Sabherwal et al., 2006).

4.1 Sample

We utilized the Scopus database in order to search and identify articles related to s-commerce adoption. The use of online databases is common within the IS literature for collecting research output to use for meta-analysis research (Alsudairi & Dwivedi, 2010; Dwivedi et al., 2019; Ismagilova et al., 2020). The following search operators were utilized to identify relevant articles: (TITLE ("S-commerce") AND TITLE-

ABS-KEY ("Adoption" OR "Acceptance" OR "Intention" OR "Use Behavior" OR "Use Behavior" OR "Purchase" OR "Buy" OR "Shopping")) AND (LIMIT-TO (DOCTYPE, "article") OR LIMIT-TO (DOCTYPE, "review")) AND (LIMIT-TO (LANGUAGE, "English"))).The search was restricted to journal articles only to ensure rigor and avoid duplication. The search yielded 193 articles. All articles were screened and reviewed in order to remove theoretical, conceptual and qualitative articles. Further, quantitative empirical papers were screened to remove any article that had not reported appropriate values (e.g., correlation, correlation coefficient, reliability, sample size, mean and standard deviation) needed for conducting meta-analysis. This process finally resulted in 68 articles that met all the requirements. Appendix A (Table 4) shows the prior studies included in our meta-analysis.

Figure 2 shows the distribution of studies by year of publication. In our sample, six studies were published in *International Journal of Information Management*, five studies in *Technological Forecasting & Social Change*, four studies in *Information & Management*, three studies each in *Behavior & Information Technology*, *International Journal of Electronic Commerce*, and *Journal of Retailing and Consumer Services*, two studies each in *KSII Transactions on Internet and Information Systems*, *Journal of Business Research*, *Journal of Theoretical and Applied Electronic Commerce Research*, *SAGE Open*, *Information Technology & People*, *Electronic Commerce Research and Applications*, and *Sustainability*, and one article each in 30 other journals.

4.2 Coding

We followed a uniform coding process to gather data from studies. For each study, the basic information such as author names, year of publication, journal name, country or region in which the research was conducted, and the technology examined were first coded. For the purposes of meta-analysis, a two-step approach was used. First, the reliability, mean, standard deviation (SD), and Likert scale anchors were coded for each of the six constructs in our research model. Second, sample size and zero-order Pearson correlation were coded for each of the 15 bivariate relationships involving the six constructs in our research model. If a study did not report correlations, other statistics were considered: Abed (2020) and Bai et al. (2015) reported squared correlations between constructs, which were coded in place of correlations. The process yielded 189 observations.

The coded data were screened for consistency with different requirements for analysis. First, the data were reviewed for independence of observations, i.e., no more than one finding from a study was included for each bivariate relationship. For instance, Abou-Elgheit (2019) used three constructs for trust, which resulted in multiple observations for the bivariate relationship between trust and behavioral intention, and hence only one observation was retained for the analysis. Second, data for construct reliabilities were not always reported in studies, especially for use behavior. Such missing data can be handled in different ways—for instance, substitute the mean of reliability for the construct computed from the other studies that reported it. Third, in cases where squared correlations were coded, the square root of the squared correlation was computed and used as the correlation. In such situations, we ensured that the constructs shared a positive association since squared correlations may not preserve the direction of the relationship.

4.3 Analysis

Quantitative meta-analytic methods (e.g., Hunter & Schmidt, 1990) were employed to obtain the corrected correlation effect size for each bivariate relationship. The observed correlations were corrected for measurement error using the reliabilities of the constructs for each relationship: $r_m = \frac{r_o}{\sqrt{r_{xx}}} r_{yy}$, where r_m is the measurement-error corrected correlation, r_o is the observed correlation, r_{xx} and r_{yy} are the reliabilities of the two constructs in the relationship. The correlations were corrected for sampling error using the sample size for each observation as the weight: $\overline{r_c} = \sum[N_i \frac{r_i}{\sum N_i}$, where $\overline{r_c}$ is the corrected correlation for the bivariate relationship, and N_i is the sample size and r_i is the correlation in each study for the relationship. The matrix of corrected correlations for all bivariate relationships is shown in Table 2 (lower triangle). Also included in the lower triangle of Table 2 are the number of findings coded

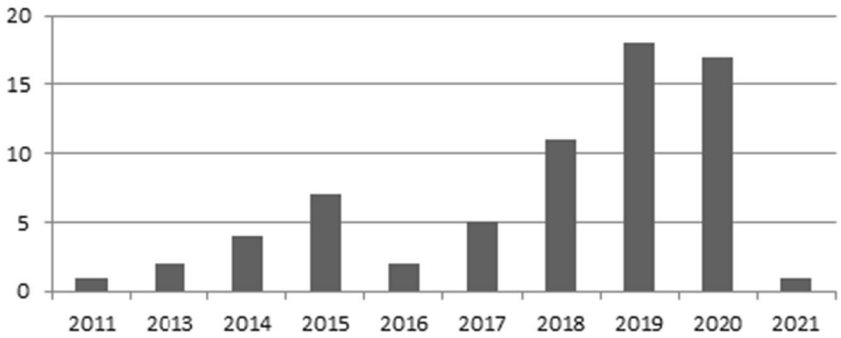

Fig. 2 Publications by Year

and the cumulative sample size ($\sum N$) for each bivariate relationship.

The credibility interval and the failsafe-N are shown in Table 2 (upper triangle) for each bivariate relationship. The credibility intervals indicate that most of the bivariate relationships are positive based on the absence of 0 within the interval (Whitener, 1990). The exceptions are the relationships involving emotional support, informational support, and behavioral intention with use behavior. The failsafe-N indicates the number of additional studies with non-significant results needed to overturn the corrected correlation obtained through the meta-analysis (Wu & Lederer, 2009). Failsafe-N ranges from 16 (for the relationship between social presence and use behavior) to 540 (for the relationship between trust and behavioral intention), which is an average of 126 across the 15 relationships. The ratio of failsafe-N to the number of findings for each bivariate relationship ranges from 5 to 14 (Sabherwal et al., 2006). These indicate that publication bias may not be a significant problem in this study.

Table 2 also includes the mean, SD, and reliability for each construct. These were computed using those observations for which such data were reported in the studies. The means and SDs reported across studies were converted to a 7-point scale. The matrix of corrected correlations (Table 2, lower triangle) was used as the basis for the MASEM analysis in Stata 15. The means and SDs for the MASEM analysis were taken from Table 2. Since the cumulative sample size differs between the bivariate relationships and MASEM analysis requires a single sample size for the entire model, the minimum sample size (939) across all bivariate relationships was used in the MASEM analysis.

5 Results

The MASEM analysis was initiated with the research model (Fig. 1). The research model showed reasonable fit: $\chi^2 = 88.42$, df = 4, $p < 0.01$, CFI = 0.968, TLI = 0.879, SRMR = 0.058, and RMSEA = 0.150. Three of the five hypothesized paths were significant. The χ^2 / df ratio was considerably higher than the recommended level of 3 (Carmines & McIver, 1981; Sabherwal et al., 2006). While CFI was acceptable (> 0.90), TLI was below the recommended threshold of 0.90 (Bentler & Bonett, 1980). SRMR was below the recommended level of 0.08 while RMSEA was considerably higher than the recommendation of 0.08 (Brown & Cudeck, 1993; Sabherwal et al., 2006). However, modification indices (MI > 10) indicated other paths that could be added to the model to achieve better fit.

The path between trust and use behavior (MI = 66.05) was added first. The resultant model showed a better fit than the research model: $\chi^2 = 19.93$, df = 3, $p < 0.01$, CFI = 0.994, TLI = 0.968, SRMR = 0.025, and RMSEA = 0.078. The three hypothesized paths supported in the previous step remained

Table 2 Meta-analysis Results

Construct	Mean (SD)	CR	TR	SP	EMS	INS	BI	UB
Trust (TR)	4.50 (1.23)	0.84		[0.355, 0.979] 86	[0.156, 0.788] 59	[0.123, 0.849] 61	[0.378, 0.949] 540	[0.251, 0.729] 35
Social presence (SP)	4.21 (1.41)	0.82	0.66 (7, 1946)		[0.341, 0.635] 61	[0.412, 0.674] 59	[0.208, 0.803] 164	[0.055, 0.594] 16
Emotional support (EMS)	4.66 (1.15)	0.85	0.47 (7, 2419)	0.48 (7, 3175)		[0.468, 0.989] 298	[0.122, 0.766] 173	[−0.166, 0.888] 24
Informational support (INS)	4.77 (1.26)	0.84	0.48 (7, 2419)	0.54 (6, 2425)	0.72 (22, 8275)		[0.172, 0.838] 182	[−0.143, 0.839] 23
Behavioral intention(BI)	4.99 (1.30)	0.84	0.66 (44, 14,687)	0.50 (18, 6402)	0.44 (22, 8056)	0.50 (20, 7018)		[−0.018, 0.970] 119
Use behavior (UB)	3.27 (1.52)	0.66	0.49 (4, 1281)	0.32 (3, 939)	0.36 (4, 2098)	0.34 (4, 2098)	0.47 (14, 5732)	

SD: Standard deviation; CR: Construct reliability (average across studies).
Lower triangular matrix contains: Corrected correlation (Number of findings, Cumulative sample size).
Upper triangular matrix contains: 90% credibility interval [Low, High] Failsafe N.

significant. The χ^2 / df ratio was higher than the recommended level of 3. Both CFI and TLI were above the recommended threshold of 0.90 and both SRMR and RMSEA were below the recommended threshold of 0.08. However, other paths were suggested by the modification indices (> 10) for better fit.

The path between emotional support and use behavior (MI = 15.44) was added next. The resultant model provided a better fit than the model in the previous step: $\chi^2 = 4.36$, df = 2, $p = 0.11$, CFI = 0.999, TLI = 0.993, SRMR = 0.009, and RMSEA = 0.035. All paths supported in the previous step remained significant. The χ^2 / df ratio was below the recommended level of 3. Both CFI and TLI were above 0.90 while both SRMR and RMSEA were below 0.08. Modification indices did not show other paths for consideration. This model was thus accepted as the emergent model (Fig. 3), and it explained 48.5% variance in behavioral intention and 29.2% variance in use behavior. Table 3 reports the goodness-of-fit statistics for the MASEM analysis.

Based on the emergent model, two hypothesized paths were not supported. Specifically, social presence (H2, β = 0.01, t = 0.58, n.s.) and emotional support (H4, β = 0.02, t = 0.68, n.s.) did not influence behavioral intention. The remaining hypothesized paths were supported, i.e., trust (H1, β = 0.56, t = 16.50, p < 0.01) and informational support (H3, β = 0.22, t = 6.02, p < 0.01) influenced behavioral intention, which in turn influenced use behavior (H5, β = 0.28, t = 6.40, p < 0.01). Two new paths emerged from the analysis—i.e., trust (β = 0.33, t = 7.14, p < 0.01) and emotional support (β = 0.16, t = 3.96, p < 0.01) had direct effects on use behavior.

6 Discussion

6.1 Findings

This study proposed a research model from the literature on trust, social support, and social presence, which was tested using MASEM methods. Three hypotheses were supported: trust and informational support influenced behavioral intention, and behavioral intention influenced use behavior. Two hypotheses were not supported: social presence and emotional support did not influence behavioral intention. Two additional paths emerged from the analysis—i.e., trust and emotional support had direct effects on use behavior.

Trust was found to be a strong predictor of behavioral intention in the context of s-commerce (H1 supported). This highlights an important role of trust in building a positive purchase intention. Trust is an important element in online shopping which has a high level of uncertainty and perceived risks (Al-Adwan, 2019). This finding can be explained by trust-based theory and is consistent with prior studies which investigated the impact of trust on s-commerce intention (e.g. Abou-Elgheit, 2019; Al-Adwan, 2019; Al-Adwan & Kokash, 2019; Al-Dwairi, 2017; Al-Tit et al., 2020; Bugshan & Attar, 2020; Chen & Shen, 2015). In addition, our analysis showed that trust had a significant impact on use behavior (emergent path).

Informational support had a significant impact on behavioral intention in s-commerce (H3 supported). Nowadays, customers have access to online forums or communities as well as rating and reviewing systems. These enable consumers to provide information to others and also use the information provided by

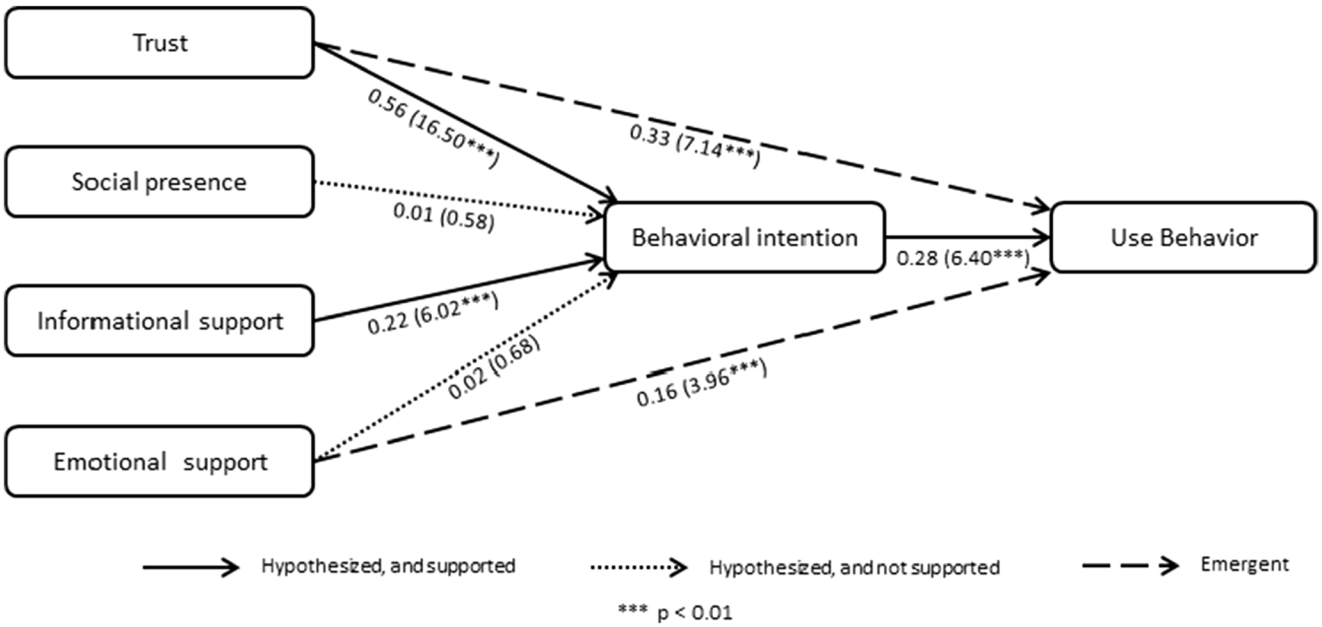

Fig. 3 Emergent Model

Table 3 MASEM Goodness-of-fit Statistics

Step	χ^2	df	CFI	TLI	SRMR	RMSEA	χ^2/df
Initial theoretical model	88.42***	4	0.968	0.879	0.058	0.150	22.10
Intermediate model (with TR → UB)	19.93***	3	0.994	0.968	0.025	0.078	6.62
Final model (with ES → UB)	4.36	2	0.999	0.993	0.009	0.035	2.18

***$p < 0.01$

other consumers in their decision-making process. These tools attract more individuals and increase their interactions, which in turn leads to the increase of user's s-commerce intention (Hajli & Sims, 2015). This finding can be explained by social support theory and is consistent with prior studies on s-commerce (e.g. Al-Tit et al., 2020; Hajli et al., 2014; Hajli & Sims, 2015; Hossain et al., 2020; Lee & Chen, 2020; Liang et al., 2011; Makmor et al., 2018; Ooi et al., 2018; Riaz et al., 2020; Sheikh et al., 2019; Zhang et al., 2014).

Purchase intention was found to significantly impact actual purchase behavior (H5 supported). This finding is also consistent with prior research in the context of s-commerce (e.g. Akman & Mishra, 2017; Chen et al., 2021; Lin & Wu, 2015; Sheikh et al., 2019; Shin, 2013; Yeon et al., 2019). Al-Adwan (2019) argues that when a consumer develops a positive purchase intention from using a particular s-commerce platform, it leads to a higher probability that he/she will perform an actual purchase.

Social presence did not have any effect on behavioral intention (H2 not supported). This finding is consistent with some prior studies on s-commerce (e.g. Friedrich et al., 2019; Molinillo et al., 2018; Zhang et al., 2014). Friedrich et al. (2019) proposed that giving an opportunity for consumers to interact with others does not affect their purchase intention on its own. Instead, social presence plays the role of facilitator for social support and social influence (Friedrich et al., 2019). Additionally, the gender of the consumers may play a role as well (Croson & Gneezy, 2009; Friedrich et al., 2019). It was found that women could be more influenced by social presence than men (Friedrich et al., 2019). Future research should consider the moderating effect of social presence on behavioral intention and also its indirect effect through other social cues (e.g. social support, social presence).

Emotional support did not influence behavioral intention (H4 not supported) but directly influenced use behavior (emergent path). This finding is supported by (Handarkho, 2020b) and may indicate that consumers need emotional support when buying products and services rather than when they are just considering or intending to purchase. These results suggest the need for more in-depth study of the influence of emotional presence on use behavior.

The findings demonstrate that a combination of perspectives from trust and social support theories was successful in predicting behavioral intention and use behavior of consumers in the context of s-commerce. Specifically, the central role of trust in s-commerce is emphasized due to the role that trust has in influencing both behavioral intention and use behavior. However, informational support and emotional support exhibited different roles—i.e., informational support influences behavioral intention but emotional support influences use behavior. This indicates perhaps that consumers find information helpful in evaluating purchase decisions but require emotional support to actually complete their purchases in s-commerce contexts.

6.2 Limitations and Directions for Future Research

This study has a number of limitations. First, the data was gathered from prior empirical studies and not based on primary data collection methods. This study thus did not have access to the original data and assumes sufficient quality and validity of prior studies in terms of data, analysis, and reporting. Second, this study did not include all prior studies that may have examined the relationships in question since they may not have reported the necessary statistics such as correlations for conducting the meta-analysis. While the failsafe-N statistics show that the meta-analyzed correlations are reliable, the analysis is limited by the studies included in the sample. Third, the sample size for each relationship in our study differs due to the number of observations and prior studies that could be included. However, MASEM requires a single sample size that is common to all relationships. This study uses the minimum sample size across all relationships, which could introduce bias into the analysis and findings. In this study, the effect of social presence on behavioral intention has been found to be non-significant. Subject to availability of adequate data, further MASEM studies should be conducted to examine if trust and/or risk mediates the effects of social commerce specific constructs such as social support, familiarity and social commerce on behavioral or purchase intention. Additionally, the current study did not conduct meta-analysis on moderating variables affecting behavioral intention and use behavior (e.g. social norm, age, gender) in the context of s-commerce because of an insufficient number of studies to perform the analysis. Future research with a large pool of studies could investigate the role of moderating variables in the context s-commerce. Finally, the proposed research model based on the meta-analysis findings needs to be validated using primary data. Future studies could validate the proposed research model applying primary survey data. Further research could also test the meta-analytical model in the context of emerging markets which will enhance the existing understanding of social commerce use in emerging markets. Finally, due to specific data requirements,

only a limited number of relationships can be tested together using the MASEM approach. However, there are a large number of relationships in s-commerce studies that do not have sufficient data points for conducting MASEM, but they may have sufficient data points to conduct general meta-analysis studies and present a cumulative view of results reported for such relationships in the existing studies. Hence, we call for conducting general meta-analysis work for such relationships related to s-commerce.

6.3 Implications for Research

This study offers several implications for research. First, our study presented an integrated model which provides an understanding of factors affecting behavioral intention and use behavior on s-commerce platforms. Prior literature on s-commerce may be considered fragmented since studies have employed various theoretical perspectives in explaining intention and behavior. There have been calls for theoretical models which can help identify major factors that influence use behavior on s-commerce sites (Al-Dwairi, 2017). The integrated research model in our study combines perspectives from trust, social presence, and social support, which can serve as the basis for extending research in s-commerce contexts.

Second, by integrating existing findings and reconciling contrasting findings, our study presents cumulative insights into consumer behavior on s-commerce platforms. A number of studies have investigated factors affecting s-commerce behavioral intention (e.g. Abou-Elgheit, 2019; Al-Adwan & Kokash, 2019; Al-Tit et al., 2020; Chen & Shen, 2015; Fan et al., 2019; Friedrich et al., 2019). But prior findings have not always been consistent. Our study shows that commonly accepted factors such as social presence and emotional support do not impact s-commerce behavioral intention contrary to prior studies (Chen et al., 2021; Friedrich et al., 2019;Handarkho, 2020a ; Hossain et al., 2020). Further, factors such as trust and informational support were found to have a significant effect on behavioral intention contrary to prior studies (Li, 2019; Molinillo et al., 2018; Nadeem et al., 2017).

Finally, our study uncovered factors that affect use behavior. While the relationship between behavioral intention and use behavior is generally accepted, there is considerable debate on the factors that influence either variable. The integrated research model in our study identified the effects of trust and emotional support on use behavior. These emergent relationships can enable further understanding of use behavior in the context of s-commerce. Based on the results of meta-analysis in terms of emergent relationships the following is proposed, which could serve as a foundation for future work.

Researchers consider trust as one of the key elements in online buying behavior (Safia et al., 2019). Consumers could be motivated to use social commerce sites if they have a high level of trust (Al-Adwan, 2019; Al-Adwan & Kokash, 2019; Al-Tit et al., 2020). Prior studies show that trust results inuse behavior online (Maharaj & Munyoka, 2019; Safia et al., 2019). Based on the above discussion the following is proposed:

> Proposition 1: *Trust has a significant positive influence on use behavior in s-commerce.*

Emotional support plays an important part in online behavior (Al-Tit et al., 2020; Handarkho, 2020a; Hossain et al., 2020). Previous research found that emotional support positively affects consumer's trust, reduces stress, risks, and product uncertainty (Bai et al., 2015; Monfared et al., 2021; Taylor et al., 2004; Yin et al., 2019). Based on social support theory and prior research findings, the following is proposed:

> P2: *Emotional support has a significant positive influence on use behavior in s-commerce.*

6.4 Implications for Practice

This study has several implications for practice. First, s-commerce managers can focus on trust and social support to increase s-commerce intention and use behavior. As trust was found to be playing a crucial role in increasing purchase intention and purchase behavior in the context of s-commerce, it is important for s-commerce providers to provide secure payment systems to their customers and make their privacy policies clear and easy to understand (Al-Adwan, 2019; Hajli, Sims, et al., 2017a). For example, s-commerce platforms could use trusted and well-known third-party payment systems (e.g. PayPal) to improve consumer trust. Prior research (Hajli et al., 2014) found that s-commerce providers can improve customer trust by having product-related information shared by other consumers outlining their experiences. Thus, s-commerce managers may motivate customers to engage in sharing information about their shopping experiences and product-related information. Timely and appropriate response strategies by s-commerce managers to handle negative comments by consumers may also help build trust (Sparks et al., 2016).

Second, s-commerce managers should develop online communities for their products, services, and brands, which consumers can use to get social support (Sheikh et al., 2019). Users in such online communities may provide informational support to other consumers due to the feelings of integration with the group, which can influence s-commerce intention and use behavior (Molinillo et al., 2018). Additionally, to provide an individual with informational support, platform managers need to provide full detail of information customers might need to make a well-informed purchase decision.

Establishing communication with customers via additional channels (e.g. direct messages, email address, online assistant) can help with additional questions about products and services. This will provide an additional informational support for users, which in turn might lead to the increase in the s-commerce intention and purchase (Handarkho, 2020a). Further, users can be encouraged to participate in such online communities through various types of monetary or virtual rewards (Chen & Shen, 2015; Garnefeld et al., 2012). For example, Garnefeld et al. (2012) argued that monetary incentives can increase community member's intention to participate, especially in the case of passive members. However, it should be noted that monetary incentives are usually effective only in short-term.

Finally, s-commerce managers may strive to establish and increase the sense of the emotional support available to consumers. The vendor can play a role of a mediator in order to ensure that the discussion, feedback and communication happening on s-commerce sites are beneficial to the community. Ensuring that the s-commerce interaction delivers a warm, supportive, caring, friendly, and sociable environment may enable platform managers to provide platform users with an enjoyable experience that can increase perceived emotional support (Handarkho, 2020a; Hossain et al., 2020). Practitioners could also encourage s-commerce users to share stories of their personal experiences and avoid providing negative or toxic comments. One way to do it could be the use of messages such as "are you sure you would like to post it?" after the user presses submit button to post a message (Lin et al., 2018). It is argued that a supportive environment can encourage users to visit the website of a company again which can result in loyalty (Hajli, 2014).

7 Conclusion

This study examined an integrated research model that combined perspectives from trust, social support, and social presence to examine the factors that influenced behavioral intention and use behavior in the s-commerce context. Based on a MASEM analysis, this study found that trust and informational support had positive effects on behavioral intention, while trust, emotional support, and behavioral intention had positive effects on use behavior. This study demonstrates that behavioral intention partially mediates the effect of trust on use behavior, fully mediates the effect of informational support on use behavior, and does not mediate the effect of emotional support on use behavior. Findings demonstrate that the research model in this study can be gainfully applied in understanding the impacts on behavioral intention and use behavior in the s-commerce context.

Appendix

Table 4 Prior studies in the Meta-Analysis sample

Study	Region	Technology	N
Abou-Elgheit (2019)	Egypt	E-commerce site	599
Al-Adwan (2019)	Jordan	S-commerce site	418
Al-Adwan and Kokash (2019)	Jordan	Facebook	237
Al-Dwairi (2017)	Jordan	S-commerce site	295
Al-Tit et al. (2020)	Saudi Arabia	Facebook & Twitter	389
Akman and Mishra (2017)	Turkey	S-commerce site	142
Attar et al. (2020)	Asian countries	S-commerce site	107
Bugshan and Attar (2020)	Asian countries	S-commerce site	400
Chen and Shen (2015)	China	Douban	376
Chen et al. (2021)	China	Xiaohongshu	282
Cheng et al. (2019)	China	S-commerce apps	614
Dabbous et al. (2020)	Lebanon	Facebook & Instagram	206
Dong and Wang (2018)	China	WeChat	511

Table 4 (continued)

Study	Region	Technology	N
Fan et al. (2019)	China	WeChat	333
Friedrich et al. (2019)	Germany	S-commerce site	237
Ghahtarani et al. (2020)	Iran	S-commerce site	254
Hajli (2014)	United Kingdom	Facebook	200
Hajli (2015)	United Kingdom	Social network site	243
Hajli and Sims (2015)	United Kingdom	Facebook	230
Hajli et al. (2015)	Malaysia	Social media sites	200
Hajli, Sims, et al. (2017a)	N/A	Facebook	201
Hajli, Wang, et al. (2017b)	United Kingdom	S-commerce site	199
Handarkho (2020a)	Indonesia	S-commerce site	750
Handarkho (2020b)	Indonesia	S-commerce site	288
Hassan et al. (2018)	Pakistan	Social network site	306
Horng and Wu (2020)	Taiwan	Facebook	970
Hossain and Kim (2020)	USA; South Korea	Social network site	549
Hossain et al. (2020)	USA	S-commerce site	232
Hu et al. (2019)	China	Weibo	303
Hung et al. (2015)	Taiwan	Facebook	446
Hung et al. (2018)	Taiwan	Social network site	166
Kim and Park (2013)	South Korea	S-commerce site	371
Lee and Choi (2014)	South Korea	S-commerce site	324
Leong et al. (2020)	Malaysia	S-commerce site	462
Li (2019)	Taiwan	Kidshome	408
Li and Ku (2018)	Taiwan	Pchome&Kidshome	357
Liang et al. (2011)	Taiwan	Plurk	411
Lin and Wu (2015)	Taiwan	Online group-buying	202
Lin et al. (2017)	China	Weibo	506
Lin et al. (2018)	China	WeChat	511
Lin et al. (2019)	USA	Amazon	903
Liu et al. (2019)	China	Dianping	288
Lu, Zeng, and Fan (2016b)	China	Taobao	546
Lu, Fan, and Zhou (2016a)	China	Online group-buying	260
Maia et al. (2019)	Brazil	S-commerce site	160
Molinillo et al. (2018)	Spain	S-commerce site	201
Ooi et al. (2018)	Malaysia	Mobile s-commerce	495
Osatuyi and Qin (2018)	USA	Facebook & Twitter	510
Rahman et al. (2020)	Bangladesh	Social network site	300
Rashid et al. (2020)	China	S-commerce site	303
Riaz et al. (2020)	Pakistan	Social network site	232
Saprikis and Markos (2018)	Greece	Social network site	433
Shahbaz et al. (2020)	China	Taobao	367
Sharma et al. (2019)	USA	Social network site	215
Sheikh et al. (2019)	Pakistan	Social network site	343
Shekhar and Jaidev (2020)	India	Social network site	267
Shin (2013)	South Korea	S-commerce site	329
Sun et al. (2019)	China	S-commerce site	504
Teh et al. (2015)	Malaysia	S-commerce site	220
Um (2019)	South Korea	S-commerce site	354
Yahia et al. (2018)	Asian countries	Instagram	205
Yeon et al. (2019)	South Korea	Social network site	323

Table 4 (continued)

Study	Region	Technology	N
Yin et al. (2019)	China	S-commerce site	291
Yusuf et al. (2018)	Nigeria	Konga& Jumia	218
Zhang et al. (2014)	China	Renren	563
Zhang et al. (2014)	China	Renren	563
Zhao et al. (2019)	China	WeChat	206
Zhou (2019)	China	S-commerce site	339

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