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Social interaction-based consumer decision-making model in social commerce: The role of word of mouth and observational learning

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ABSTRACT

Social commerce mediated by social media and social network platforms has led to the development of new business models in e-commerce and digitized the consumer decision journey. Social interaction is considered as a prerequisite for successful social commerce since consumers now expect an interactive and social experience while making purchase decisions. Drawing on word of mouth (WOM) and observational learning theories, we conceptualize social interactions in social commerce environments into two forms: WOM communication and observing other consumers' purchases, and examine their impact on consumer purchase intention and actual purchase behavior. Analyzing primary data ($n = 217$) collected from surveyed active consumers within social commerce sites at two stages (pre-purchase and post-purchase), we found that positive and negative valence WOM, WOM content, and observing other consumers' purchases significantly affect consumers' intention to buy a product, thereby increasing the likelihood of actual buying and sharing product information with others on social commerce sites.

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1. Introduction

Owing to the growing popularity of social media, online business models have shifted from traditional e-commerce that focuses on one-click buying and one-way browsing to social commerce that enables consumers to digitize their purchase decision journey by establishing two-way communications and sound collaborative relationships with other consumers (Huang & Benyoucef, 2013). The commercial impact of social commerce will soon influence more than half of all retail transactions and is expected to reach $2 trillion in the U.S. alone by 2016, according to a report by Forrester Research (Mulpuru, Sehgal, Evans, Poltermann, & Roberge, 2012). This trend not only encourages companies to invest in social media to increase consumer engagement and harness product and brand development, but also the factors that drive social commerce success have become a topic of intense debate in the fields of marketing and information systems (IS) (Liang, Ho, Li, & Turban, 2011; Stephen & Toubia, 2010; Wang & Zhang, 2012; Zhang, Lu, Gupta, & Zhao, 2014; Zhou, Zhang, & Zimmermann, 2013).

Many scholars argue that one prerequisite for successful social commerce is to orchestrate a compelling customer experience in which social interactions are fully embedded at every stage of the customer decision-making process (Cheung, Xiao, & Liu, 2014; Huang & Benyoucef, 2013; Kim & Park, 2013; Zhou et al., 2013; Yadav, de Valck, Hennig-Thurau, Hoffman, & Spann, 2013). The importance of social interaction is widely recognized in e-commerce environments (Hennig-Thurau, Gwinner, Walsh, & Gremler, 2004; Liu, 2006; Park & Kim, 2008; Yap, Soetarto, & Sweeney, 2013; Lu, Li, Zhang, & Rai, 2014); consumers are eager to obtain more relevant product information and professional suggestions (e.g., ratings, comments, and recommendations) from others' expertise and experience since products have become increasingly complex and technical in nature (Godes et al., 2005). This type of information is often termed user-generated content and is perceived as a more reliable source of information than traditional media (Goh, Heng, & Lin, 2013). It can be produced and diffused quickly through various social interaction activities that will assist consumers in making timely and accurate purchase decisions (Huang & Benyoucef, 2013). Since social interaction is likely to fulfill an essential role in shaping consumers' decision making behaviors, it is important to understand how the social interactions that take place in social commerce environments contribute to marketing potential.

Social interaction can be broadly defined as any actions an individual engages in that affect other consumers' valuations or decisions regarding a product or service (Godes et al., 2005). Previous studies have suggested that online consumers who take part in a variety of social interaction activities are most likely to follow

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through with their intention to make a purchase. However, most of these studies have focused exclusively either on the design features of social commerce issues (e.g., Curty & Zhang, 2013; Hajli, 2015; Huang & Benyoucef, 2013; Wang & Zhang, 2012) or social influence issues (e.g., Hajli, 2014; Hsiao & Wang, 2015; Liang et al., 2011; Luarn, Kuo, Chiu, & Chang, 2015; Wang & Hajli, 2014) as they seek to understand how consumers interact with each other through Web 2.0 technologies in social commerce environments. As yet, the role of social interaction still remains vaguely understood, and the link between social interaction and consumer intention and behavior has not been examined.

Furthermore, most social commerce-related studies have tended to treat consumer perception or intention (e.g., intention to buy) as the ultimate outcomes of their model (Liang et al., 2011; Park, Shin, & Ju, 2014). Yadav et al. (2013) suggest that future research in this area should examine the path from social interaction to transaction, because frequent interactions in virtual environments may not endorse the probability of an eventual sale. To bridge these gaps, this study sets out to answer the following research question: Do social interactions in the social commerce environment affect consumers' intention to purchase, which in turn leads to actual purchase and post-purchase behaviors?

To answer this question, we start by conceptualizing the social interactions and consumer decision-making process and then move on to examine contemporary theories that link these social interactions with the outcomes of consumers' decision making process. The main goal of this study is to explore how social interaction activities (i.e., WOM communication and observing other consumers' purchases) affect the intention to purchase, and whether these activities in addition increase the probability of making an actual purchase in the context of social commerce.

This paper is organized as follows: the following three sections review the literature on the antecedents of purchase intention in social commerce, and propose the theoretical model and associated hypotheses guiding this research. In Sections 5 and 6 we describe the research method and present the results of our analysis. The final two sections discuss the contributions of this study and the implications for management scholars and practitioners.

2. Literature review: antecedents of purchase intention in social commerce

Social commerce is defined as "exchange-related activities that occur in, or are influenced by, an individual's social network in computer-mediated social environments, where the activities correspond to the need recognition, pre-purchase, purchase, and post-purchase stages of a focal exchange" (Yadav et al., 2013, p. 312). Social commerce is thus a combination of shopping and social networking activities that support social interaction activities in the buying and selling of products and services in online settings (Wang & Zhang, 2012). Although interest in social commerce has begun to attract some academic attention, it has not yet generated a rich body of literature in this research stream. We therefore began by identifying relevant articles using the Web of Science database to search for the keyword "social commerce" in English appeared in the titles of articles; focusing on the published year dating from 2010 to 2015. The search engine returned 59 results. Articles considered for inclusion in this study meet the following criteria: title; abstract and a primary focus on what motivates consumers to participate in social commerce and make a purchasing decision. Then 15 papers were reviewed more thoroughly and categorized in terms of two key antecedents of customers' intention to purchase a product within a social commerce site shown in Table 1.

Many studies of social commerce have discussed the new design features of social commerce and how they are designed to facilitate consumer interaction and engagement and tailor consumers' decision making processes (Curty & Zhang, 2013; Hajli, 2015; Huang & Benyoucef, 2013; Wang & Zhang, 2012). Our review suggests that specific design features of social commerce could play a critical role in enhancing consumer participation. Hajli (2015) points out that specific social commerce features such as recommendations, referral mechanisms, ratings and reviews all generate valuable information that strongly influences customer behavior and purchasing decisions. Curty & Zhang (2013) conduct an historical analysis of the actual e-commerce websites and find that website technical features regarding transactional, relational and social emphases have reshaped companies' business and marketing strategies, specifically, strengthening customer and merchant ties through relational features. Noh, Lee, Kim & Garrison (2013) indicate that individuals' perceived usefulness and perceived ease of use predict individuals' intention to engage in social commerce, though the inclusion of price consciousness acts as a moderating variable. These studies agree that social commerce, along with its technical features and applications, allows consumers to establish new social relationships on social media platforms that not only help them collect useful product information, but also reassure them that they are making a sound decision when purchasing a product.

Going beyond an emphasis on social commerce features, a growing number of studies borrowing theories from the psychology field argue that consumers' social influences are positively the key to success of social commerce (e.g., Hajli, 2014; Hajli, Shanmugam, Hajli, Khani, & Wang, 2015; Liang et al., 2011; Zhang et al., 2014). Liang et al. (2011) indicate that online customers choose to purchase products as they acquire social support and sound relationship quality from others. Similarly, building on the stimulus-organism-response paradigm model, Zhang et al. (2014) reveal that factors related to technological environmental factures of social commerce would significantly affect customers' social influences (i.e., social support, social presence and flow), and these influences boost their intention to use social commerce sites in return. These studies highlight that social influence could be the significant determinants of the consumer's decision to purchase a product or service provided by social commerce sites.

3. Theoretical basis and research model

Drawing on WOM theory (Arndt, 1967) and observational learning theory (Bandura, 1977; Bikhchandani, Hirshleifer, & Welch, 1998, Bikhchandani, Hirshleifer, & Welch, 2008), we conceptualize social interactions in social commerce environments into two forms: WOM communication and observing other consumers' purchases. The original WOM theory assumes that WOM information is an indispensable experienced source created by individuals or marketers, and is then diffused by consumers or marketers to other consumers (Arndt, 1967; Engel, Kegerreis, & Blackwell, 1969). WOM information aims to help consumers fully understand a service or a product before its consumption and might also shape expectations of service (Bansal & Voyer, 2000; Zeithaml and Bitner, 1996). The rise of social media allows WOM theory to evolve from the concept of linear marketer influence to one based on network coproduction. The concept of network coproduction assumes that consumers are regarded as active coproducers of value and meaning and WOM communications are coproduced in consumer networks, groups, and communities. With this new insight, WOM theory is particularly well suited for investigations of consumer social interactions in social commerce environments.

WOM communication can be viewed as "a verbal informal communication occurring in person, by telephone, email, mailing list, or any other communication method" (Goyette, Ricard, Bergeron, &

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Table 1
Antecedents of purchase and participation intentions in social commerce.

	Antecedents	Sources
Design characteristics of social commerce	Different characteristics of social commerce platforms (+)	Hajli (2015); Hajli et al. (2014); Hajli and Sims (2015); Huang and Benyoucef (2015); Kim and Park (2013); Park et al. (2014)
	Technological features: perceived interactivity (+), perceived personalization (+) and perceived sociability (+)	Zhang et al. (2014)
	Perceived enjoyment (+), Perceived ease of use (+) and perceived usefulness (+)	Noh et al. (2013); Sharma and Crossler (2014); Shin (2013)
	Web quality (+)	Liang et al. (2011)
Social influence	Social support (+)	Hajli (2014); Hajli and Sims (2015); Liang et al. (2011); Shin (2013); Zhang et al. (2014)
	Social presence (+)	Zhang et al. (2014)
	Social ties (n.s.)	Wang et al. (2013)
	Closeness (+), familiarity (+)	Ng (2013)
	Attitude (+), subjective norms (+), perceived behavioral control (+)	Hajli et al. (2015); Shin (2013)
	Online WOM (+), peer consumer purchase (+)	Wang et al. (2013); Zheng et al. (2013), Cheung et al. (2014)
	Relationship quality (+)	Hajli (2014); Liang et al. (2011)

Note: (+) positive impact on purchase intention; (ns) non-significant.

Marticotte, 2010, p. 9). Godes et al. (2005) defined it as an opinion-based social interaction that consumers use as a recommendation or rating system to interact with others by discussing a service or a product. In the context of social commerce, Hajli, Lin, Featherman, and Wang (2014) conceptualize WOM as social commerce constructs that produce WOM information by recommendations and referrals, ratings and reviews, and forums and communities. In this study, we define WOM communication as user-generated content conveying positive or negative information related to sellers and products/services that is disseminated and communicated within social networks.

Another form of social interaction, the tendency to observe others consumers' purchase behaviors and decisions can be explained by observational learning theory (Bikhchandani et al., 1998, 2008; Chen et al., 2011). Observational learning refers to learning through observing the behavior of other people, which could affect the individual's behavior in many ways, with both positive and negative consequences (Bandura, 1977). This theory highlights that people gather information from others when they are faced with new tasks that allows them to virtually eliminate the need for complex mental processing effort on making a decision (Bandura, 1977). People weight on others' information more heavily than their own information when observational learning occurs (Banerjee, 1992). Applying this theory to consumer behavior research, earlier studies have stated that consumers' product-adopting decisions could be shaped by those of previous consumers (Bikhchandani et al., 1998; Park & Lessig, 1977). Simpson, Siguaw, and Cadogan (2008) have explained that the opinions of others' purchases can be regarded as the information to take into consideration in the purchase decision-making process, because such information as a heuristics enables consumers to simplify decision making and overcome information overload. Research on e-commerce has revealed that the information obtained from observing previous consumers' purchases is associated with purchase actions (buy or not buy) (Chen et al., 2011; Cheung et al., 2014; Liu & Sutanto, 2012). We would therefore argue that WOM communication and observing other consumers' purchases are essential elements of social interaction in social commerce for capturing the properties of social interactions among consumers, and their effects will thus influence consumers' decision making processes.

To measure consumers' decision making processes, we employ two outcome variables from the technology acceptance model (TAM) and the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980) in our model: behavioral intentions to purchase and actual purchase (Davis, Bagozzi, & Warshaw, 1989). Fig. 1 depicts our research model; the key constructs and associated hypotheses will be discussed in the next section.

4. Hypothesis development

4.1. The impact of WOM communication on purchasing intentions

The relationships between WOM-related constructs and consumer purchase behavior have been well illustrated in the existing literature (see a systemic literature review on electronic WOM communication provided by Cheung & Thadani, 2012). In the current study, we focus on the impact of WOM valence and content on consumer purchase behavior. WOM valence can be both positive and negative (Hennig-Thurau et al., 2004), and have shown that consumers tend to weigh negative product reviews more heavily than positive product reviews during purchase evaluation and decision making (Cheung & Thadani, 2012; Park & Lee, 2009). In general, positive WOM from satisfied customers emphasizes the strengths and expected quality of a product, while negative WOM from unsatisfied customers underscores the weaknesses and potential problems of a product (Dellarocas, Zhang, & Awad, 2007). Properly leveraged, it not only helps sellers to improve sales, but also supports consumers as they make purchasing decisions (Goyette et al., 2010). A recent study by Wang, Wang, Fang, & Chau (2013) finds evidence to support the positive online WOM as an effective type of consumer interaction for social commerce stores' survival.

The content of WOM regarding its volume and quality could be an important factor in influencing consumer purchase intentions (Amblee & Bui, 2011; Cheung et al., 2014; Duan, Gu, & Whinston, 2008; Goyette et al., 2010). By developing an online review quality mining tool, for instance, Zheng, Zhu & Lin (2013) indicated that the quality of online consumer reviews such as total helpfulness votes received is important in deriving better use of social commerce. Cheung et al. (2014) found that an increase in the total number of ratings on products in a particular brand provided extra support for consumer purchase decisions. In addition to the volume of WOM, Wang et al. (2013) emphasize that online WOM content regarding buyer feedback in social commerce environments, such as a faithful description of listing products, service attitudes throughout the transaction, and product dispatch speed, were all positively related to social commerce site survival. In this study, we focus on the impacts of positive and negative WOM as well as the content of WOM on consumer purchase decisions in the context of social commerce. We expect that the more positive and less negative

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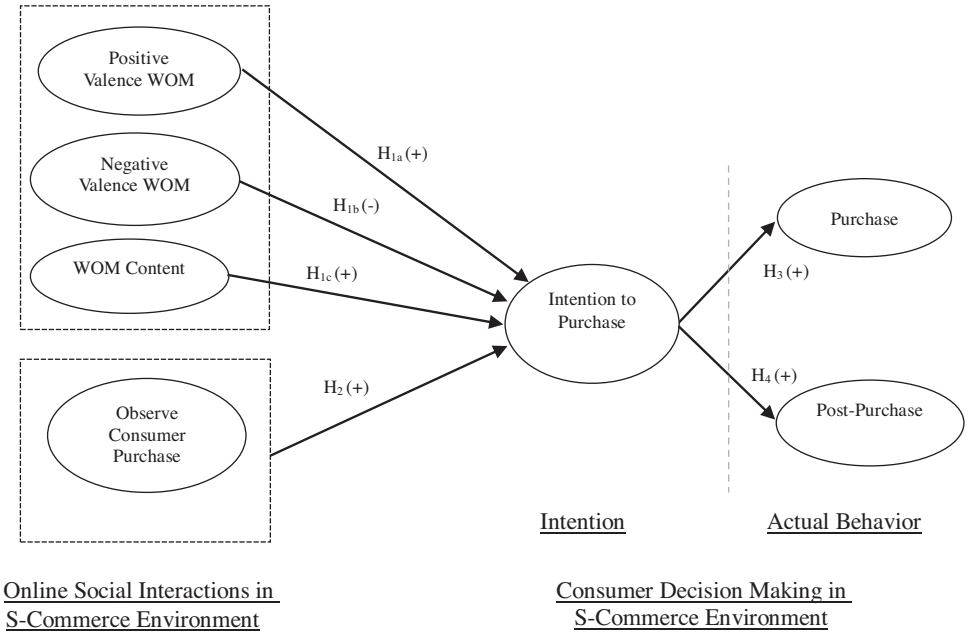

Fig. 1. Theoretical Model.

WOM content posted by peer consumers, the more likely consumer purchasing intentions will increase or happen. We postulate the following hypotheses:

Hypothesis 1a. Positive valence WOM will positively influence consumer purchasing intentions.

Hypothesis 1b. Negative valence WOM will negatively influence consumer purchasing intentions.

Hypothesis 1c. The content of WOM will positively influence consumer purchasing intentions.

4.2. The impact of observing consumer purchases on purchasing intentions

Earlier works demonstrate that the actions of another person or group have significant influence on others' decision-making in many contexts (e.g., Bikhchandani, Hishleifer, & Welch, 1992; Hanson & Putler, 1996). For example, online users have a stronger tendency for downloading software with a higher number of downloads (Hanson & Putler, 1996). Based on the observational learning theory, Chen et al. (2011) view observing other consumers' purchases as a behavior-based social interaction in e-commerce settings. Consumers tend to observe others' purchasing decisions and learn others' purchasing behavior, because they usually have imperfect knowledge about the product they are purchasing (Park & Lessig, 1977). Product knowledge learned from other consumers could be a complementary source that combined with their own experience, results in more accurate purchase decisions.

In the context of social commerce, Cheung et al. (2014) agreed, stressing that prior purchase information provided by other consumers on a social commerce site (i.e., Number of products added to the "buy-lists" of a member's reference persons) can provide a reference basis for purchasing a product to later consumers, and this information may positively affect subsequent consumers' purchase decisions. For example, consumers on Fancy.com (one of the most famous social commerce sites) make purchase decisions after engaging in a series of observation learning activities, such as browsing product feeds, extensively reviewing online opinions, following users who have similar interests, and observing how many users have already purchased the product, even without knowing their identities and reasons for choosing this product. Using a panel data set consisting of accurate sales data from Groupon.com, Li & Wu (2013) find that a deal with the higher cumulative number of vouchers sold in real-time is likely to receive more sales in the next period. This implies that consumers with uncertainty over the value of the deal would observe the total number of vouchers purchased by other peers prior to making a purchase decision. Therefore, we argue that previous purchase information provided by other consumers can be a strong referral for later consumers regarding product price and quality, and may thus increase consumer's purchase intentions. We postulate the following hypothesis:

Hypothesis 2. Observing consumer prior purchases will positively influence consumer purchasing intentions.

4.3. The impact of intention to purchase on purchase and post-purchase

A model for consumers' purchase decision-making process in social commerce, i.e., demand recognition, pre-purchase activities, the purchase decision and post-purchase activities, has been proposed by Yadav et al. (2013) to capture the key aspects of consumers' activities during product purchase. The model assumes that these four inter-related phases may not follow each other in a linear fashion and not all four phases will be applicable to all purchases. To understand how a consumer makes a purchase decision driven by social interactions, we selected pre-purchase, purchase, and post-purchase activities as the outcomes of our research model.

During the pre-purchase activity, consumers spend their time searching for information and evaluating alternative options, progressively constructing their intention to purchase a product. Intention to purchase is one of the psychological factors that can lead to actual purchase behavior (Kim, Ferrin, & Raghav, 2008). The formation of purchase intention is the process through which a consumer selects, organizes, interprets, and compares the information obtained from various shopping platforms and channels (Sheth, Mittal, Newman, & Sheth, 2004). After acquiring sufficient information and assessing the trustworthiness of this information, consumers will identify the determinants that they will use to com-

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pare the various alternatives and make decisions based on what they perceive about a product.

Making a purchase decision is the main mission in the purchase phase. Consumers choose which product to buy and which retailer to purchase from when they buy something, and the consumer may be concerned about other pertinent terms and conditions of purchase. Consumers do not only commit money to buying a product, they also expend their time and energy on evaluating the acquired product. When product characteristics are complex and expensive, such as health insurance, holiday packages or digital cameras, consumers often make suboptimal decisions in this phase (Häubl, Dellaert, & Donkers, 2010).

In the post-purchase phase, consumers may compare their current consumption experience with what they had anticipated before making a purchase. At the same time, they may share their consumption experience through the website communication channels, including the web site's evaluation and review mechanisms, tweets, blog posts, or the "like" button on Facebook (Hennig-Thurau et al., 2004) to discuss the details of the product they have purchased and recommend a product they feel satisfied with to their friends.

Drawing on the technology acceptance model (TAM) (Davis et al., 1989), the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980), and Yadav et al. (2013)'s consumers' decision-making framework, we argue that pre-purchase, specifically the intention to purchase on a certain social commerce site, is a predictor of a consumer's actual behaviors regarding their subsequent purchase decision and post-purchase activities. Therefore, we propose the following two hypotheses that posit that purchase intention will affect actual purchase and post-purchase behaviors.

Hypothesis 3. A consumer's purchasing intention will affect his/her actual purchase on a social commerce site.

Hypothesis 4. A consumer's purchasing intention will affect his/her post-purchase behavior on a social commerce site.

5. Research methodology

5.1. Data collection and procedures

To test the research model, we investigated consumers' social interaction behaviors and purchasing intentions as they shopped on the social commerce sites, decided whether or not to purchase a product, and posted product related information, such as reviews comments, experiences and recommendations after they purchased online. We recruited the research participants from three undergraduate-level courses at a university in the southeastern United States and employed a survey to collect primary data. Extra credit was offered to encourage voluntary participation. A snow-ball technique was included to maximize the number of valid samples for the data collection process (Corbitt, Thanasankit, & Yi, 2003); respondents earned additional bonuses by inviting their friends to participate.

The research procedure for this study was performed following the method suggested by Kim et al. (2008), who carried out an investigation into online trust on e-commerce sites, and was specifically designed to test the relationship between purchasing intention and actual purchase behavior. The participants were asked to sign up for an account on one of the recommended social commerce sites. They were then asked to read the terms of use for the site they had selected and seek to understand the entire online buying process and the features offered by the site. The data were collected in two rounds through paper-based surveys: a pre-purchase round and a post-purchase round. After one month observing their preferred social commerce sites, the participants received the pre-purchase questionnaire that posed questions about social interaction behaviors (WOM communications and observing consumer purchase) and purchasing intentions. The post-purchase questionnaire was sent to participants a few weeks later asking two questions related to their post-purchase behavior. If the participants failed to complete one of the two surveys, the responses were deemed incomplete and eliminated from our data set.

A total of 217 responses were received and included in the sample for construct validation and hypothesis testing. The demographic characteristics of the respondents indicated that the majority of the participants in our sample were active online consumers. Over 85% of our participants reported that they had purchased products at least five times online in the last year, and nearly 75% had more than one year's experience in using social commerce sites for shopping. Over 70% of our participants had spent more than $50 online in the last three months. Appendix A shows the demographic characteristics of the respondents.

5.2. Measurements

The two round questionnaires were used to understand consumers' social interaction, pre-purchase and post-purchase behaviors. The pre-purchase questionnaire included all the questions relating to WOM communications, observing consumer purchases and purchasing intentions. All the items in the first round questionnaire were adapted from the literature and modified as needed for this study (see Appendix B). All items used a five-point Likert scale ranging from 1 = "strongly disagree" to 5 = "strongly agree".

The measurement of WOM communication in the context of social commerce has not yet been formalized in the existing literature. We therefore chose to operationalize WOM communication using items from the context of e-services (Goyette et al., 2010) because of the similar characteristics to our research context. Thus, WOM communication was measured by three underlying constructs: positive valence WOM, negative valence WOM, and WOM content (Chen et al., 2011; Goyette et al., 2010). These three underlying constructs were examined separately, as suggested by Goyette et al. (2010), and have been structured by reflective indicators. Observing consumer purchase was included to understand consumers' social interaction behavior and whether or not they observe and learn from other members' shopping behaviors. We developed a new three-item scale based on those used in previous studies (Chen et al., 2011; Cheung et al., 2014; Wang & Chiang, 2009) since there was no previously existing scale. The four-item scale for the intention to purchase was modified from Noh et al. (2013) and Sharma and Crossler (2014) to fit our research context.

The post-purchase questionnaire consists of just two questions: (1) did you purchase a product on your preferred social commerce site? (2) After you had received the products you had ordered, did you share product related information such as product reviews, recommendations, user experience, or complaints with other members on your preferred social commerce site? In this second round, participants reported their actual purchase decision and post-purchase behavior.

5.3. Common method bias

This study collected data from a single source at a time. In order to reduce common method bias, Podsakoff, MacKenzie, Lee, and Podsakoff (2003) suggest following specific guidelines during the design of a study and the associated data collection processes. We protected respondent-researcher anonymity, provided clear directions to the best of our ability, and proximally separated independent and dependent variables. We then tested for bias statistically using Harman's one factor test (Greene & Organ, 1973).

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Table 2
Descriptive statistics and correlations.

Variable	Mean	S.D.	Alpha	CR	WOM_P	WOM_N	WOM_C	OCP	IOP
WOM_P	3.53	.84	.82	.82	**.73**				
WOM_N	2.38	1.17	.87	.87	−.56**	**.88**			
WOM_C	3.56	.86	.89	.89	.33**	−.45**	**.75**		
OCP	3.46	.93	.82	.82	−.30**	−.31**	.36**	**.77**	
IOP	3.55	.96	.71	.72	.43**	−.51**	.36**	.32**	**.68**

Note: $N = 217$; CR—composite reliability; alpha—Cronbach's alpha; S.D.—standard deviation; The bold values on the diagonal line are the square roots of AVE. Legend: WOM_P—positive valence WOM; WOM_N—negative valence WOM; WOM_C—WOM content; OCP—observe consumer purchase; IOP—intention of purchase.
** $p < .01$.

The unrotated factor solution indicated that no factor accounted for 50% or more of the variance, which suggests that common method bias was not a significant issue. Moreover, following a procedure suggested by Pavlou, Liang, & Xue (2007), we also compared correlations among the constructs. The results revealed no constructs with correlations over .7, whereas evidence of common method bias ought to have brought about greatly high correlations ($r > .90$). Consequently, these tests suggest that common method bias is not a major concern in this study.

6. Data analysis and results

To test the proposed research model, data analyses for both the measurement model and structural model were performed using structural equation modeling (SEM). Given our research model and objectives, SEM enjoys several advantages over analysis techniques such as linear regression because SEM can examine proposed causal paths among constructs (Gefen, Rigdon & Straub, 2011). We analyzed the data using IBM Amos 22 and IBM SPSS Statistics 22 (Arbuckle, 2013).

6.1. Reliability and validity

To ensure the appropriateness of the research instrument, content validity, reliability and construct validity were tested. We assessed the appropriateness of the original instrument for content validity by first conducting a thorough review of the literature on the subject of the study, and then recruiting a small panel of five researchers, and five senior doctoral students. The content evaluation panels reviewed our instrument in terms of format, content, understandability, and speed of completion, identified specific items that should be added or deleted from the instrument, and provided suggestions for improvement. Five items were modified to more closely fit our context in accordance with their suggestions.

The reliability was tested using Cronbach's alpha and composite reliability (Fornell & Larcker, 1981). Table 2 presents the descriptive statistics (i.e., means and standard deviations), Cronbach's alphas, AVEs, composite reliability, and construct correlations. The Cronbach's alphas (ranging from .71 to .89) indicate a satisfactory degree of internal consistency reliability for the measures (Bollen & Lennox, 1991) with all values well above .70 (Nunnally & Bernstein, 1994). Construct reliability was assessed based on the composite construct reliabilities (CR), computed using the formula: $\rho = (\Sigma li)\, 2/((\Sigma\lambda i)\, 2 + \Sigma\theta\, i)$, where λi refers to the ith factor loading and θ i refers to the ith error variance (Hair, Black, Babin, & Anderson, 2010, p. 687). As shown in Table 2, the CRs ranged from .89 to .98, well over the commonly accepted cutoff value of .70 (Hair et al., 2010), thus demonstrating the adequate reliability of the measures.

Discriminant validity was first assessed by examining the factor correlations. Although there are no firm rules, inter-construct correlations below |.7| are generally considered to provide evidence of measure distinctness and thus discriminant validity (Ping, 2003). None of the factor correlations were greater than .7, which demonstrates discriminant validity (see Table 2). An alternative way to examine discriminant validity is to compare the average variance extracted (AVE) to the squared inter-construct correlation. When the AVE is larger than the corresponding squared inter-construct correlation estimates, it is suggested that the indicators have more in common with the construct they are associated with than they do with other constructs, which again provides evidence of discriminant validity (Kline, 2010). The data shown in Table 2 suggest the adequate divergent validity of the measures.

6.2. Exploratory factor analysis

For the measurement property evaluation, exploratory factor analysis (EFA) was conducted to explore the factor structure. Before performing the factor analysis, we first verified that the data were appropriate for factor analysis using two tests: the Kaiser–Meyer–Olkin (KMO) test and the Bartlett sphericity test. The results of both tests indicated that a factor analysis would be useful given our data.

The initial factor analysis using principal components analysis extracted five factors that were evident on the scree plot, all with an eigenvalue greater than one, indicating good discriminant validity. Factor loadings for the positive valence WOM block ranged from .626 to .850, the negative valence WOM block ranged from −.701 to −.771, the WOM content from .727 to .808, observing consumer purchase from .697 to .765 and intention to purchase from .797 to 851. Overall, the results for EFA achieved standard factor loadings of .6 as the cut-off significance (Hair, Black, Babin, Anderson, & Tatham, 1992), confirming that individual factors can be identified in a given block of dimensions. Factor loadings for each construct are shown in Appendix C.

6.3. Measurement model

The measurement model was then analyzed to assess the measurement quality of the constructs using a confirmatory factor analysis (CFA). The measurement model consists of five latent factors (positive valence WOM, negative valence WOM, WOM content, observing consumer purchase, and intention to purchase). The loading ranges for the positive valence WOM were from .669 to .825. The loading ranges for negative valence WOM were from .872 to .877. The loading ranges for the WOM content were from .657 to .842. The loading ranges for observing consumer purchase were from .739 to .832. The loading ranges for the intention to purchase were from .596 to .769. The model chi-square was statistically significant (χ^2 (124) = 288.859, $p < .000$), which indicates that the exact fit hypothesis should be rejected. However, this test is highly sensitive (Jöreskog & Sörbom, 1986), so other measures of goodness-of-fit were also examined. The comparative fit index (CFI) was .916, which exceeds the cutoff value of .80 (Hair, Black, Babin, & Anderson, 2009), and the standardized root mean square residual (SRMR) was .0517, which is less than .08 (Hu & Bentler, 1999). The root mean square error of the approximation (RMSEA) is .078, which is less than .08 (Byrne, 2001). Thus, we concluded that our data adequately fit the measurement model.

6.4. Structural model

After confirming an adequate fit for the measurement model, we assessed the fit of our structural model. The goodness-of-fit of the structural model was comparable to that of the previously described CFA model. The hypothesized model appears to fit the data well, as shown in Fig. 2. Based on this evidence of acceptable fit, we then moved on to test our hypotheses.

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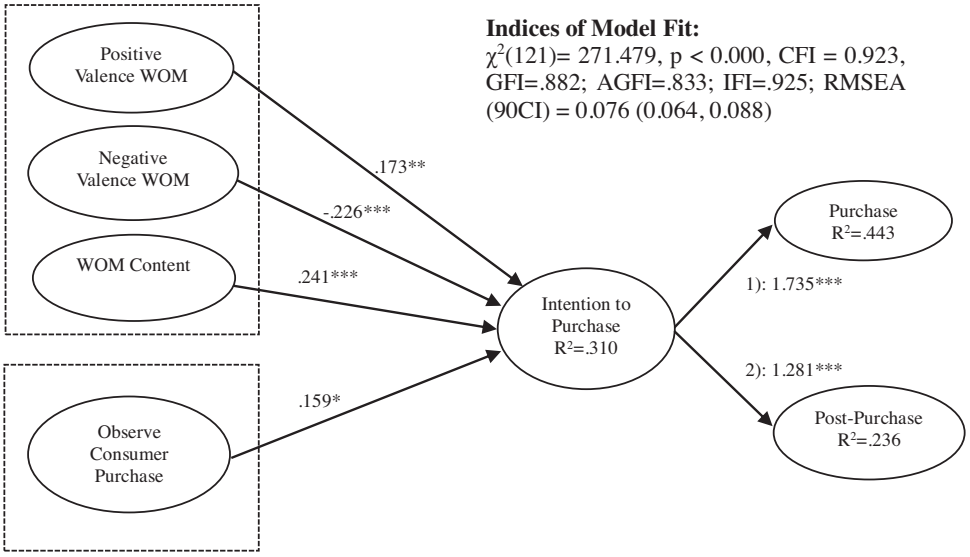

Fig. 2. Results of structural model.
Note: * significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.
(1 and 2): result of a logistic regression analysis of the bivariate relationship.

6.5. Hypotheses testing

The impact of intention to purchase and post-purchase behaviors (H3 and H4) were tested using the logistic regression analysis (LRA), while the impact of two antecedents (WOM communication and observe consumer purchase; H1a, H1b, H1c, and H2) on intention were tested using the SEM approach. Each indicator was modeled in a reflective manner. Model estimation was performed using the maximum likelihood technique. We chose maximum likelihood parameter estimation over other estimation methods (e.g., weighted least squares, two-stage least squares) because the data were fairly normally distributed (Kline, 2010).

Fig. 2 shows the results of the assessment and hypothesis testing. All paths were significant at the .05 level or better. As shown in the figure, the first construct of WOM communication, positive valence WOM, had a strong positive effect on a consumer's purchasing intentions and the second construct, negative valence WOM, had a strong negative effect on intention to purchase. As expected, WOM content positively influences intention of purchase. Thus, H1a, H1b, and H1c were all supported. Among the antecedents of intention to purchase, observe consumer purchase was significant at the $p < .05$ level, validating H2. The R^2 for intention to purchase was .31, indicating that the model provides strong explanations of the variance in consumers' intention in the social commerce environment.

The nature of our dependent variables, (1) purchase and (2) post-purchase, 'indicate that they are categorical and dichotomous (purchase or not purchase; post purchase or not post purchase). We conducted a logistic regression analysis of the bivariate relationship to estimate the impact of intention on purchase and post-purchase (Hilbe, 2011). The logistic regression model also included four other constructs as potential predictors so that the effects of intention on purchase and post-purchase could be isolated from other effects. Tables 3 and 4 present the results from the logistic regression analysis for consumers' actual purchase and post-purchase behaviors, respectively. We found that a greater degree of customer purchasing intention led to higher actual purchase behavior (beta = 1.735, R^2 = .443; $p < .001$), while other constructs did not have a strong effect on purchase (Log Likelihood Ratio $L = 212.383$, $p < .001$), thus validating H3. The Omnibus test was significant ($P = .000$) and the Hosmer–Lomeshow test resulted in $p = .770$ that indicate a good fit

Table 3
Summary of statistics and logistic regression results (dependent variable: purchase).

Purchase	Intention mean	Intention S.D.	N		
Not purchase (0)	2.97	.98	101 (46.54%)		
Purchase (1)	4.06	.62	116 (53.46%)		
Results of logistic regression analysis					
	Chi-square	d.f.	Sig.		
Model	87.406	5	.000		
−2Log likelihood(L)	212.383				
Variable	Coef.	S.E.	Wald	Sig.	R^2
Intention	1.735	.277	39.148	.000	.443
Positive valence WOM	−.016	.246	.004	.947	
Negative valence WOM	.070	.194	.129	.719	
WOM content	−.345	.239	2.089	.148	
Observe consumer purchase	.455	.202	5.079	.024	
Constant term	−.654	1.726	14.354	.000	

Table 4
Summary of statistics and logistic regression results (dependent variable: post-purchase).

Post-purchase	Intention mean	Intention S.D.	N		
Not post-purchase (0)	3.33	.995	158 (72.81%)		
Post-purchase (1)	4.15	.519	59 (27.19%)		
Results of logistic regression analysis					
	Chi-square	d.f.	Sig.		
Model	38.541	5	.000		
−2Log likelihood(L)	215.405				
Variable	Coef.	S.E.	Wald	Sig.	R^2
Intention	1.281	.276	21.577	.000	.236
Positive valence WOM	.195	.246	.627	.428	
Negative valence WOM	.155	.197	.620	.431	
WOM content	.052	.215	.058	.809	
Observe consumer purchase	.038	.195	.037	.847	
Constant term	−7.234	1.839	15.479	.000	

in first model. We also found that intention was indeed a predictor of post-purchase behavior (beta = 1.281, R^2 = .236; $p < .001$) while comparing to other constructs (Log Likelihood Ratio $L = 215.405$, $p < .001$), thus supporting H4. The Omnibus test was significant ($P = .000$) and the Hosmer–Lomeshow test resulted in $p = .495$ that indicate a good fit in second model. To summarize, the results strongly suggest that when consumers have a higher level of intention to purchase from social commerce sites, they are most likely to

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actually purchase from those sites and post their product feedback or review on the sites after they do so.

7. Discussions

Based on our data analysis, all of the hypotheses received significant support. First, positive valence WOM and the content of WOM are the main drivers for improving consumers' purchase intention. This discovery is consistent with the findings of several studies (e.g., Amblee & Bui, 2011; Cheung et al., 2014) which reported that the increase in the volume of peer consumer reviews will facilitate the likelihood of consumer purchase decision. This study further confirms that consumers will collect product information though discussing a product's quality, variety and price with their peers, and compare alternative opinions by reading positive and negative product reviews prior to making a purchase decision. Second, our results reveal that observing and learning other consumers' behaviors on the social commerce platforms do increase the intention to purchase. Further, this study confirms that consumers will observe their peers who share purchase decisions and experiences, and learn from them to make suitable choices. Finally, we found that purchase intention significantly exerts impacts on both actual purchase and post-purchase behavior. This shows that consumers will purchase a product on a social commerce site and share their product review and user experience as they have a strong intention to purchase.

7.1. Theoretical implications

Based on these findings, we offer the useful insights regarding the theoretical implications. First, the design characteristics in social media have been emphasized on current social commerce research. The findings of prior studies highlight that new design features can facilitate social support and relationship quality that lead to consumers' intention to buy a product in social commerce platforms. However, there is a lack of understanding on how consumers' interact with others through these new designs, and whether these interactions will lead to actual purchase and post-purchase behaviors in the context of social commerce. Grounded in relevant literature, this study illustrates how social interactions affect consumers' purchase intention and post-purchase actual behaviors. The research results highlight the importance of WOM communication and observation learning for social commerce as they influence purchase intentions, which in return increases the likelihood of actual purchase and information-sharing behavior. Thus, this study provides strong evidence to bridge this gap.

Second, the conceptualization and operationalization of the construct of social interaction has contributed to the deeper understanding of how consumers interact with other peers prior to make a purchase decision on social commerce sites. When it comes to measure social interactions in the context of social commerce, few previous studies have examined it by social influence factors or by count variable summing up all the parameters related to consumer engagement activities. In this study, we investigate the impacts of WOM communication and observing consumer purchase on individual decision making, which more fully captures social interaction.

7.2. Managerial implications

For the leaders who are responsible for implementing social media in their business, we provide strong evidence to support the importance of social interaction for social commerce in improving consumers' purchase intentions. The results of this study can be used to improve the designs of social commerce sites and develop marketing strategies for increasing consumers' interaction activities. For instance, in practice, although new social commerce sites are constantly launching, only a few actually make social buying aspects prominent. The finding shows that the purchase intention and actual purchase behavior of consumers are encouraged by online product reviews that are shared within a trusted social group. Therefore, social commerce platforms should improve their interactive functions and provide a convenient channel for consumers to seek out and share their purchase experiences more easily, making product information more transparent and helping consumers mitigate the isolation inherent in most online activities.

In addition to facilitating WOM communication, observing consumer purchase is a major element of social interaction. This study finds that the impact of observing consumer purchase strengthens purchase intention. Therefore, social commerce sites are advised to invest in social technologies that creates consumer ratings and feedback mechanisms or new shopping functions thereby consumers are easier to access information from other buyers' past purchase actions or usage activities.

8. Limitations and suggestions for future research

Limitations of this study may create some interesting opportunities for extending our research. First, student-based survey was used in this study. Although students represent a large portion of the online shopper population, there is a need to enrich the collection of data on a more general customer basis. An interesting follow-up study may involve retrieving data from global markets in order to examine cultural differences; future research could also assess potential differences among age groups given a more representative sample. For instance, aged consumers may be more concerned about sharing their private information. It is likely that for these adults more effort and time may be taken before mutual trust is built within brand communities due to probable perceived lack of security. This may reflect the different impact of social interactions on the purchase intention.

Second, in order to complement the general lack of adequate survey methods that allow researchers to make strong inferences, future research could consider applying qualitative methodologies (e.g., content analysis and focus groups) or social media analytics approaches to explore what are the most frequently occurring types of social interaction activities on social commerce sites.

Third, given its exclusive focus on social interaction, our study does not consider other possible factors leading to the increase in purchase intention. Recent studies have emphasized that consumers' privacy concern and perceived risk towards social networking sites has been found to be negatively related to their intentions to share information and purchase a product (Featherman & Hajli, 2015; Hajli & Lin, 2014; Sharma & Crossler, 2014). It is necessary to conduct a more comprehensive study concentrating on other factors that may play an enabling, moderating or mediating role to affect consumers' social interactions.

9. Conclusion

This study investigated purchase intentions and actual purchase behaviors in a social commerce environment from the perspectives of WOM and observational learning to examine social interactions. Both types of social interaction activities embedded on social commerce sites influence the intention to purchase and hence the actual purchase and post-purchase behaviors. More specifically, our results revealed that positive valence WOM and WOM content significantly affect consumers' intention to buy a product in a social commerce community. At the same time, our study found that intention to purchase driven by social interaction in social

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commerce can increase the likelihood of actual buying and sharing product information with peers. Therefore, this paper provides a theoretical model to explain how a consumer decides to purchase a product on a social commerce site through interacting with the platforms themselves, the sellers, and other buyers.

Appendix A. . Demographic characteristics of respondents

Demographic	Range	Frequency	Percentage (%)
Age	20–29	217	100%
Gender	Male	94	43.3%
	Female	123	56.7%
Education Level	Enrolled in college or with a high school degree	217	100%
How many years using the social commerce sites for shopping	less than 6 months	2	.9%
	6–12 months	51	23.5%
	1–2 years	105	48.4%
	3–4 years	42	19.4%
	5–7 years	10	4.6%
	more than 7 years	7	3.2%
Frequency of online purchases in last year	Never	11	5.1%
	1–5	19	8.8%
	6–10	103	47.5%
	11–15	46	21.2%
	16–20	32	14.7%
	More than 20	6	2.8%
Money spent online in last three months	Less than $25	14	6.5%
	$26–50	48	22.1%
	$51–100	90	41.5%
	$101–300	51	23.5%
	$301–500	7	3.2%
	$301–500	7	3.2%
Total Responses		217	100.0%

Appendix B. . Measure and items

Word-of-mouth communication (Goyette et al., 2010)

Positive valence WOM

1. I recommended my favorite social commerce site to others.
2. I have spoken favorably of my favorite social commerce site to others.
3. I speak of my favorite social commerce site's good sides to others.
4. I am proud to say to others that I am my favorite social commerce site's customer. (Deleted).
5. I strongly recommend people buy products online from my favorite social commerce site.
6. I mostly say positive things about my favorite social commerce site to others (Deleted).

Negative valence WOM

1. I mostly say negative things to others on my favorite social commerce site.
2. I have spoken unflatteringly of e-vendors to others on my favorite social commerce site.

WOM content

On my favorite social commerce site, I discuss with others about. . .. . .

1. The quality of the product offer.
2. The variety of the product offer.
3. The user-friendliness.
4. The security of transactions.
5. The prices of products offered.
6. Ease of transactions.
7. The delivery methods (Deleted).
8. The sellers' notoriety (Deleted).

Observe consumer purchase (new development)

Social commerce sites allow consumers to follow other members' wish-list, buy-list, check in to show that s/he has already recommended or bought the product. Please indicate the extent to which you agree or disagree with each statement by ticking the appropriate number.

1. Often when buying the product of the brand, I follow the members who have bought the product on my favorite social commerce site.
2. Often when buying the product of the brand, I observe other members' past purchase actions by viewing their buy-lists or check-in list.
3. Often when buying the product of the brand, I read the previous comments on my favorite social commerce site.

Intention of purchase (Noh et al., 2013; Sharma & Crossler, 2014)

1. I am likely to provide my personal information to purchase on social commerce sites.
2. I plan to provide my personal information for purchasing on social commerce sites.
3. I intend to provide my personal information for purchasing on social commerce sites.
4. I intend to use social commerce sites for finding low prices (Deleted).

Note: we deleted the items with standard factor loadings below .6 after conducting the initial factor analysis.

Purchase and post-purchase (Kim et al., 2008)

1. Did you purchase a product on your preferred social commerce site?
2. After you had received the products you had ordered, did you share product related information such as product reviews, recommendations, user experience, or complaints with other members on your preferred social commerce site?

Appendix C. . Items and factor loadings

Items	Factors				
	1	2	3	4	5
WOM content					
WOM content _02	.808				
WOM content _03	.801				
WOM content _01	.790				
WOM content _04	.742				
WOM content _06	.742				
WOM content _05	.727				
Positive valence WOM					
Positive valence WOM_02		.850			
Positive valence WOM_03		.805			
Positive valence WOM_01		.717			
Positive valence WOM_05		.626			
Intention to purchase					
Intention to purchase_03			.851		
Intention to purchase_02			.809		
Intention to purchase_01			.797		

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Observe consumer purchase					
Observe consumer purchase_02				.765	
Observe consumer purchase_03				.758	
Observe consumer purchase_01				.697	
Negative valence WOM					
Negative valence WOM_02					−.771
Negative valence WOM_01					−.701
Eigenvalues	3.836	2.700	2.278	2.018	1.856
Cumulative% of variance	21.312	36.313	48.968	60.176	70.489

Note: extraction method: principal component analysis. Rotation method: Varimax with Kaiser normalization.

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