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Temporal effects of information from social networks on online behavior: The role of cognitive and affective trust

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Abstract

Purpose – The purpose of this paper is to examine the temporal effects of perceptions of information obtained from social networks (SNS) on online shopping behavior using trust as a mediator. The model adopts the two dimensional view of trust: cognitive and affective trust. The direct effects and indirect effects of information perceptions on behavioral intentions are empirically explored using a longitudinal approach. Specifically, we investigate the comparative roles of cognitive and affective trust on the influence of perceptions of information from SNS on online shopping behavior.

Design/methodology/approach – The study was fielded at two points in time (T and T+1) that were approximately 14 months apart. The survey (T) was distributed via e-mail to 1,484 prospects. From this mailing, 297 prospects who had not replied and another 145 with missing data were removed, leaving 1,042 respondents. In all, 14 months later, the survey (T+1) was e-mailed to these 1,042 respondents who took part in the survey at time point T. At time point T+1, only 341 respondents from the original sample responded. After excluding those with missing values, the final sample included 313 respondents.

Findings – The results show significant carryover effects from time T to time T+1 in perceptions of information obtained from a social network, in behavioral intentions and in both dimensions of trust. Furthermore, the study revealed that over time, the influence of affective trust is greater than that of cognitive trust, both in its effect on behavioral intentions as well as in its mediating role between information perceptions and behavioral intentions.

Originality/value – The study contributes to the literature on the mediating roles of cognitive and affective trust in the development of behavioral intentions on over time in the social network environment.

Keywords Social networks, Shopping

Paper type Research paper

1. Introduction

The literature on online behavior, understandably, focusses on the trust construct. Perceptions of information and the trust (in the sources) placed on web-based social networks (SNS) are widely recognized as key influencers on online behavior (Araujo and Neijens, 2012; Huang, 2012; McCole *et al.*, 2010). Further, sharing information on web-based

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SNS is complex and dynamic; and, the drivers of behavioral intentions change over time (Johnson *et al.*, 2006) as customers interact and are exposed to multiple customer interactions on the website.

Although the literature implies that SNS are an important resource for creating online trust, there is a critical gap in the literature about how that trust is created. Specifically, we lack an understanding of how the effects of SNS information perceptions on behavior intentions change and evolve. What are the direct or indirect effects in the temporal changes? Even though changes in behavioral intentions and purchase intentions have been empirically studied, no studies have looked at the dynamic effect of information within SNS on behavioral intentions over time. Prior research confines SNS to: information/data sources (Ackland, 2009); online communities (Brown *et al.*, 2007); and web-based services (Boyd and Ellison, 2008). In order to improve our understanding of how SNS influence online behavior we attempt what Nitzan and Libai (2011) called for – papers that formally examine various social effects and provide empirical evidence of how social effects on customers increase or decay over time.

Previous studies on the dynamic effects of behavioral intentions have confirmed that satisfaction or perceived value change over time (Johnson *et al.*, 2006; Mittal *et al.*, 1999). Since web-based business' performance is closely related to revisit actions, we need to understand online customers' repeat visits inasmuch as they depend on website trust build over time and invoking the need for a longitudinal perspective (McCole *et al.*, 2010). Thus, we posit a theoretical framework using trust as an explanatory variable for why online customers change their behavior over time. We particularly focus on the effect of trust-based evaluations in online repeat visits. Specifically, we investigate the roles of cognitive and affective trust on the influence of perceptions of information in SNS on online shopping behavior.

From the theoretical perspective, this study contributes to the growing literature on information obtained through SNS by examining both temporal and carryover effects using the longitudinal approach. A longitudinal approach is especially useful since customer relationships evolve over time (Rust *et al.*, 2010). In addition, this research develops the interplay of two types of trust by examining whether the interrelationships among cognitive trust, affective trust, and behavioral intention change over time. Lewicki *et al.* (2006) observed that most of the empirical trust research provided limited insight into the dynamic nature of the growth and decline of trust over time. One exception is Webber (2008), who used the longitudinal approach to study how cognitive and affective trust develops over time in student project teams. However, Webber's study does not address how trust is developed in online networks and markets. Specifically, it remains to be examined how the two types of trust mediate the relationship between SNS information perceptions and behavioral intentions. Such an understanding should have major implications for both managing SNS and improving trust to achieve higher marketing performance. Thus, our study extends prior findings by examining the dynamics of trust as determinants of online behavioral intentions as they develop over time.

From the practical perspective, our approach has certainly not escaped managers' attention, as they have tied these variables and longitudinal effects to website management and consumer relationships (Pagani *et al.*, 2011). In particular, they are interested in capturing changes in consumer behavior from a long-term management perspective, but unfortunately, no research has simultaneously investigated the relative influence of proposed variables across time. This gap in the literature requires

a new empirical research, leading to following two unanswered questions. Do social network services really encourage behavioral intentions by increasing two types of trust? If so, which one (direct or indirect effects of social network services) is more powerful for managing website performance? Thus, this study is both timely and necessary from a marketing and online website management perspective.

This paper is organized as follows: first, we describe research on the dynamics of behavioral intentions and, develop our theoretical framework and hypotheses. Next, we describe the research methodology and the empirical test using longitudinal data from online shoppers. Finally, we discuss the findings, offer managerial implications, note the limitations of our study and conclude with suggestions for future research.

2. The dynamics of behavioral intentions

Corporate investments in communication efforts confirm continued interest in the status of the customer in terms of behavioral intentions and in the ensuing anticipated impact on firm performance (Mittal *et al.*, 1999). Most of the early work focussed on an individual's attribute-level evaluation on their behavioral intentions (Mittal *et al.*, 1999) or on the link between satisfaction-value and behavioral intentions (Johnson *et al.*, 2006). These studies demonstrate that intention drivers are dynamic, meaning, that they vary considerably over time. For example, Mittal *et al.* (1999) compared subsequent intentions using two types of satisfaction for vehicle owners during different two time periods. Similarly, Johnson *et al.* (2006) compared loyalty intentions using perceived value, affective commitment, and brand equity for cellular users during three different time periods. Therefore, these studies demonstrate interest in adopting a dynamic perspective on customers' behavioral intentions. However, very few studies on behavioral intentions in online behavior have utilized a longitudinal perspective. Additionally, the theory of trying (Bagozzi and Warshaw, 1990) posits that more affective-based attitudes come to mediate the effect of performance perceptions on intentions over time. This effect evolves when a consumer is unclear about his/her true intentions with respect to some act. In our context of online behavioral intentions, we should expect that the impact of the perceptions of SNS information on behavioral intentions will be mediated by some form of trust (or commitment).

Meanwhile, one may argue that changes in the behaviors and perceptions of consumers during the time elapsed between T and T+1 are not easily detected by consumers themselves. This is because these changes can be very gradual and relatively insignificant at any given time compared to an immediately previous and short time period. Further, the consumption system traced to a General Living Systems Theory (see Reidenbach and Oliva, 1981), can help us gain a structural view of consumption experiences (Mittal *et al.*, 1999). Based on the consumption system approach, a longitudinal examination between time point T and time point T+1 is useful for a better understanding of changes in consumer behaviors and perceptions (for a review, see Ha and Janda, 2011; Johnson *et al.*, 2006; Mittal *et al.*, 1999).

This study, examines the role of cognitive and affective trust as mediators in the relationship between SNS information perceptions and behavioral intentions. While scholars have long considered the importance of online trust as a key of business performance, we have not come across any longitudinal studies on behavioral intentions in the context of online shopping that use trust a key mediator variable. Furthermore, Boulding *et al.* (2005) called for longitudinal studies such as this one which documents before and after behavior.

2.1 SNS information perceptions

Dellarocas (2003) conceptualizes SNS information perceptions as a broad construct that encompasses perceptions of overall SNS informational quality given people's thoughts, reactions, and opinions about a specific website. It is based on the perception of the outcomes or benefits arising from users' shared consumption (similar) experience (Mathwick *et al.*, 2008; Yang *et al.*, 2014). To better understand SNS information perceptions and the construct's dimensions, the IT literature and frameworks provide a guide for measuring the central construct: information integrity (Lee and Turban, 2001; Nicolaou and McKnight, 2006); and information quality (Kim *et al.*, 2008; Lee *et al.*, 2002).

Social network services such as Facebook, Twitter, and Kakoa Talk used in this study have been considered as a key source of information among people with shared interests. People obtain and evaluate different types of information from such sources as blogging, and photo/video-sharing (Boyd and Ellison, 2008; Yang *et al.*, 2014), where people are able to easily share their personal thoughts, reactions, and opinions. Similarly, reviews on shopping mall sites such as Amazon, are useful when customers are shopping for products. Such SNS information on mall sites may be viewed as more credible, relevant, and emphatic than marketer-provided sources of information (Gruen *et al.*, 2006; McCarthy *et al.*, 2014). People are easily able to retrieve information, and, it is free and convenient to access. Related constructs of interest to scholars include perceptions of information credibility (Flanagin and Metzger, 2000), networks of practice (Mathwick *et al.*, 2008), and online feedback mechanisms (Dellarocas, 2003). However, information quality perceptions differ from credibility, which means how believable a party is (Nicolaou and McKnight, 2006; Tseng and Fogg, 1999). Thus, quality perceptions do not overlap with the concept of trust. Prior IT studies also support our research approach (e.g. Kim *et al.*, 2008; Nicolaou and McKnight, 2006; Yang *et al.*, 2006).

In our study, we focus on the particular case of the retail website mall advisor, who does not promote any particular brand, but, provides reviews and answers questions on any product available on the website. All of the advisor's responses to inquiries and questions from users are visible to all others on the site, thus creating the SNS environment in which users can all learn from the online interactions.

2.2 Cognitive trust, affective trust, and behavioral intentions

Scholars treat the trust construct as multi-dimensional. For instance Ganesan and Hess (1997) proposed two dimensions of trust in a relationship: "credibility" – a partner's intention and ability to keep promises; and, "benevolence" – evidence of genuine concern through sacrifices that exceed a purely egocentric profit motive. Other scholars have used credibility (or, reliability) and benevolence as two dimensions of trust. Further, several authors (e.g. Aurier and Lanauze, 2012; Johnson and Grayson, 2005; Komiak and Benbasat, 2006; McAllister, 1995) have labeled credibility (or reliability) as cognitive trust and benevolence as affective trust. McAllister (1995) defined cognitive-based trust which would involve a person's use of evidence and analysis to form attributes of the trust components that represent the rational part of human judgment, and distinguished it from affect-based trust that stems from affective bonds among individuals. In this labeling frame, trust appears to parallel the structure of the construct of "attitude." It is reasonable to infer that cognition-based trust represents a low level of trust, while affect-based trust represents a higher level of trust (McAllister, 1995; Ranganathan *et al.*, 2013). Affective trust is based on experience from interacting with the service provider, while cognitive trust is generally based on a state of incomplete knowledge or information cues (Johnson and Grayson, 2005).

In the marketing literature, cognitive trust has been described as reflecting a confidence or willingness to rely in a service provider to meet specific expected behaviors (Johnson and Grayson, 2005). In partnerships, cognitive trust grows from accumulated knowledge or experience that allows one to make predictions, with some level of confidence, regarding the likelihood that a partner will live up to his/her obligations. Knowledge is accumulated from observation of behavior within the relationship and from reported reputation in other relationships. When reputation effects are strong, initial interactions become opportunities to confirm or disconfirm prior perceptions and cognitive trust soon becomes definitive. Lewichi and Bunker (1995) proposed a trust building model, which consists of three sequential and linked levels: first, calculus-based trust which represents the lowest levels and the most fragile form of trust; second, knowledge-based trust, which is formed over time with increased knowledge about each other. This level of trust represents a relatively strong bonding between two parties and is practical for an exchange relationships; third identification-based trust, which is based on shared interests and values. This last and highest level is the strongest form of trust and least fragile to changing environments. In yet another framework, Sheppard and Sherman (1998) conceptualized trust as four distinct and ordered forms: shallow dependence, shallow interdependence, deep dependence and deep interdependence.

Affective trust is the confidence one places in a partner on the basis of feeling generated by the level of care and concern the partner demonstrates (Johnson and Grayson, 2005). It is characterized by a feeling of security and perceived strength of the relationship. Reputation effects also influence affective trust, but affective trust is decidedly more confined to personal experience with the partner than is cognitive trust (Dabholkar *et al.*, 2009; Johnson and Grayson, 2005). The essence of affective trust is a reliance on partner based on emotions. As emotional connections deepen, trust in a partner may venture beyond that which is justified by available knowledge. Affective trust is closely related to the perception that a partner's actions are intrinsically motivated (Rempel *et al.*, 1985).

2.3 Interplay between cognitive and affective trust, and behavioral intentions

Kim *et al.* (2004), conclude that although trust does develop over time, higher levels of trust could develop earlier in a relationship when cognitive cues such as group member reputation (Ranganathan *et al.*, 2013; Webber, 2008) are present. Such a primacy effect of cognition has been found in a variety of contexts. Does cognition precede affect in the development of trust as it has been proven with the development of attitude? Researchers (McAllister, 1995; Webber, 2008) show that cognitive trust influences affective trust, especially in the early stages of relationship formation. In recent studies on offline financial service delivery, Johnson and Grayson (2005) provide empirical evidence of a positive impact of cognitive trust on affective trust. In online contexts, Kanawattanachai and Yoo (2002) found that virtual teams formed cognitive trust before developing affective trust. Komiak and Benbasat (2006) found that cognitive trust is an antecedent to affective trust in the adoption of online recommendation agents. Therefore, cognitive trust is expected to have a positive effect on affective trust. McAllister (1995) found that cognition-based trust is less enduring than emotional trust. For productive working relationships among managers, some level of cognition-based trust may be necessary for affect-based trust to develop.

In the marketing literature, behavioral intentions reflects a consumer's propensity to purchase and have been widely accepted as reflecting a desirable outcome of trust. For example, a consumer's willingness to transact with a particular website is a predictor

of online consumer behavior (McKnight *et al.*, 2002; Hsu *et al.*, 2013). Venkatesh and Davis (2000), confirmed a strong correlation between behavioral intentions and actual behavior in a longitudinal study. In this study, we define behavioral intentions in terms of consumer intentions to engage in any of two specific behaviors: first, purchase products or services from a particular website; and second, recommend the website to others.

3. Proposed model

Fundamentally, as shown in Figure 1, we propose that SNS information perceptions build behavioral intentions directly, as well as indirectly through cognitive and affective trust. The direction of the perceptions-trust link is supported by an initial Trust Building Model (TBM) (McKnight *et al.*, 2002). Adapting TBM in this study is reasonable because the initial time frame is important for deriving perceptions about a particular website that could determine whether or not consumers will use the website in the future. If so, consumers' perceptions of SNS information about the website are particularly crucial for building trust. This is because in the initial relationship, they depend on information perceptions for making trust-related inferences about the website (McKnight *et al.*, 1998). Another direction of the trust-behavioral intentions link is related to the Theory of Reasoned Action (TRA). According to the TRA (e.g. Albarracin *et al.*, 2001; Madden *et al.*, 1992), a consumer's perceptions and attitudes will influence that consumer's actions when he/she believes that certain behavior will be linked to a specific outcome. Thus, a consumer's perception regarding trust should influence his/her behavioral intentions to participate in online purchasing activity (Liu *et al.*, 2004).

The interplay between cognitive and affective trust explains the evolution of trust (Kim *et al.*, 2004). Similar to the mechanism of coping proposed by Bagozzi (1992), the initial evaluation leads to an emotional reaction that, in turn, drives behavior. Adapting the coping framework to the SNS context suggests that quality of online shopping information and value appraisals of information precede trust (Boyd and Ellison, 2008).

In the literature on the evolution of trust, only three studies have used a longitudinal approach (c.f. Johnson *et al.*, 2006; Mittal *et al.*, 1999; Tang *et al.*, 2012). They have all focussed on the evolution of consumer perceptions (cognitive and affective) in the

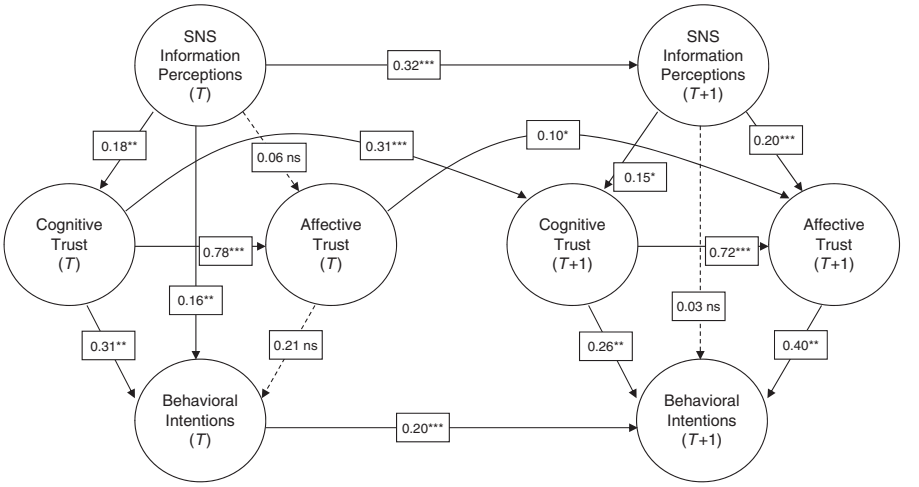

Figure 1.
Model estimation results

Notes: *$p<0.05$; **$p<0.01$; ***$p<0.001$

development of trust. Typically, the primary thesis is that changes in such perceptions are likely to result in changes in behavior. Our model is built on the notion that the evolution of trust and consequential behavior is an iterative process such as in Autry and Golicic's (2010) relationship strength-performance spiral, which focusses on the continual correction or amplification of relationship strength based on performance of participants in a relationship. Thus, we emphasize the evolutional phases of cognitive and affective trust in the way that relationships self-correct over time.

3.1 Temporal effects of SNS information perceptions

A number of studies have demonstrated that the determinants of behavioral intentions are dynamic and vary over time. That is, outcome varies as a function of time and other predictors (Singer and Willett, 2003). Indeed, Johnson and *et al.* (2006) also point out that an important factor to consider when modeling this evolution is the existence of temporal or carryover effects from one period to another. We, therefore, build temporal effects of SNS information perceptions distinguishing between (SNS information) perceptions at two temporally displaced points in time: initial (T) phase and later (T+1) phase. While the initial phase refers to judgment of SNS information quality in getting the attention of potential customers, and turning the attention into action, in the later phase, judgment of SNS information quality is evolving into what is sustainable in the perceptions of SNS information. We expect that SNS information perceptions to have a direct effect on behavioral intentions at time point T. Using Bagozzi and Dholakia's (2002) conceptualized participation in SNS and Wang and Chang's (2013) SNS experience, we expect that SNS information perceptions exert a great deal of influence on consumers in a purchase decision. However, in their study on SNS, Nitzan and Libai (2011) found that perceptions of SNS information decay over time. Therefore, we hypothesize that the relationship between SNS information perceptions and behavioral intentions at time point T will be weaker at time point T+1. Thus, the first set of hypotheses is:

H1a. Perceptions of SNS information have a direct, positive effect on behavioral intentions.

H1b. This relationship will weaken from time T to time T+1.

Online consumers need some way to reduce the large amounts of information accessible online so as to select and process just that which is relevant. Since SNS is a natural resource for getting such information, we can discuss how consumers make decisions to accept or reject-specific information items based on whether they are relevant or not. Initially, SNS information perceptions are mainly information-driven because perceptions are developing and become poignant only when they relate to decisions, choices, and outcomes (Rachlin, 1989). Since cognitive trust is knowledge-driven (Johnson and Grayson, 2005), one anticipates that consumers' perceptions of information are directly linked to cognitive trust (Shin, 2010). Meanwhile, as mentioned earlier, consumers' perceptions of SNS information decay over time. Thus, we also predict that the relationship between SNS information perceptions and cognitive trust at time point T will weaken at time point T+1. Hence, the second set of hypotheses:

H2a. Perceptions of SNS information have a direct, positive effect on cognitive trust.

H2b. This relationship will weaken from time T to time T+1.

Perceptions of SNS information may also directly affect affective trust. For example, a consumer with a number of social connections may feel secure and confident about

his/her perceptions toward a particular SNS. On the other hand, when consumers encounter a new SNS, and there is little information to draw on from memory, they are likely to also depend on their feelings often elicited on exposure to a new stimulus (Pham *et al.*, 2001). There is research that has shown that affective responses to stimuli are evoked much quicker than cognitive response (Homburg *et al.*, 2006). According to the affect-as-information framework, consumers often form overall evaluations based on their feelings because they perceive these feelings to contain valuable judgmental information (King *et al.*, 2014; Pham *et al.*, 2001). Nitzan and Libai (2011) also found that customer loyalty may help to "immunize" customers against negativity while positive perceptions improve affective trust. Thus, the relationship between SNS information perceptions and affective trust at time point T may strengthen at time point $T+1$. As interactions with more connected people increase and individual attachments develop, positive perceptions reinforcing affective trust may become more favorable over time. A consumer's affective state with social connections may color his/her experience of trust and affection may be enhanced over time (Johnson *et al.*, 2006). Thus, the third set of hypotheses:

H3a. Perceptions of SNS information have a direct, positive effect on affective trust.

H3b. This same relationship will strengthen from T to $T+1$.

3.2 Temporal effect between cognitive and affective trust

It has been argued that the relationship between cognition and affect in attitude formation is bidirectional (Johnson and Grayson, 2005). Oliver (1997, p. 319) states that "affect coexists alongside various cognitive judgments in producing satisfaction." However, the affective state can contain a significant cognitive component for having an attitude toward a particular object (Jones, 1996). Thus, it could be argued that cognitive trust provides a base for affective trust and exists before affective trust develops (Komiak and Benbasat, 2004; Ranganathan *et al.*, 2013). This argument is also evident in the affect infusion model (Forgas, 1995). Forgas' model is a cognitively-oriented approach for describing the role of affect in judgment processes (Homburg *et al.*, 2006) and fits well with the temporal perspective. Therefore, we should expect that the relationship between cognitive and affective trust will be reinforced over time. It is likely to take place because after the initial absence of evidence for cognitive evaluation, and with more cognitions, its influence on affect, increases over time. Thus:

H4a. Cognitive trust has a direct, positive effect on affective trust.

H4b. This relationship will strengthen from T to $T+1$.

3.3 Temporal effects of cognitive trust

Cognitive trust is helpful in understanding and explaining how SNS information is interpreted by online users (Parayitam and Dooley, 2009) and its subsequent impact on behavioral intentions (Becerra and Korgaonkar, 2011). Empirical research has supported a link between cognitive trust and intentions (Johnson and Grayson, 2005). Behavioral outcomes of trust have longevity (Zahedi and Song, 2008). Cognitive trust is iterative because a cognitive state is gradually modified and combined with new information and experiences in forming a new state (Anderson, 1991). In an organizational behavior study, Kanawattanachai and Yoo (2002) point out that the level of cognitive trust increases temporally in high-performing virtual teams. In line

with this observation, we expect that cognitive trust has a direct effect on behavioral intentions and that this effect increases over time. Thus, the following set of temporal effect hypotheses:

H5a. Cognitive trust has a direct, positive effect on behavioral intentions.

H5b. This relationship will strengthen from T to T+1.

3.4 Temporal effects of affective trust

Similar to the previous hypothesis, and, even more so, the direct effect of affective trust on behavioral intentions should increase over time, because affective-based trust is more likely to be enhanced than cognitive-based trust over time (Ranganathan *et al.*, 2013; Rousseau *et al.*, 1998). This approach is consistent with Lewicki and Bunker's argument, which asserts that trust moves developmentally through the three bases within a relationship (cognition, affection, and action). Similarly, Webber (2008) found in her longitudinal study of team performance, that the impact of affective trust on performance increased over time. As this study views an action as behavioral intentions, the next set of hypotheses captures the increase in the effect of affective trust on behavioral intentions over time:

H6a. Affective trust has a direct, positive effect on behavioral intentions.

H6b. This relationship will strengthen from T to T+1.

3.5 Carryover effect of SNS information perceptions

According to the cycle of satisfaction (Oliver, 1997) and the evolution of loyalty (Johnson *et al.*, 2006), a key factor to consider when modeling the dynamic evaluation of time dependence is the existence of the carryover effect. The carryover effect occurs when conditions are applied to the same participant(s) from time point T to T+1 (Mittal *et al.*, 1999). In this study, carryover effects occur when online users exchange their information with other networked people and such interactions increase when people are frequently contacted on a specific information or brand. Thus, the following three carryover effects in a given period are a function of attitudes over time.

In general, the strong carryover effects of online social sites imply a long-term impact (Bruhn *et al.*, 2012; Trusov *et al.*, 2009). When information is relatively complete and easy to obtain, the carryover effect at the market level should be small (Anderson *et al.*, 1994), such as in the case of information available from SNS sources. In other words, since SNS is readily available and more frequently accessed in the digital era, the incremental updating effect of each piece of SNS information should be relatively small. Thus, albeit a smaller temporal effect, the following hypothesis becomes evident:

H7. Perceptions of SNS information at time point T have a positive effect on perceptions of SNS information at time point T+1.

3.6 Carryover effect of trust

Since trust (cognitive and affective) is a psychological state that endures the other party's situational or temporal vulnerability (Singh and Sirdeshmukh, 2000), there ought to be an enduring period-to-period effect (La and Choi, 2012). Such an effect is further supported by the information integration theory (Anderson, 1991), wherein affective states, attitudes, and beliefs are not generally replaced by new information or event. Instead, old state, attitudes, and beliefs get integrated with new information (Zahedi and Song, 2008). As trust is built by the direct effect of SNS information perceptions in this study, trust revision takes the

form of contrast and adaptation depending on the positive or negative effect of the strength of prior trust. Thus, trust evolution is dynamic from time T and time T+1 (Tang *et al.*, 2012). As consumers continue to shop at a particular website, the carryover effect should be positive. Thus, the hypothesis for both cognitive and affective trust:

H8a. Cognitive trust at time point T has a positive effect on the same construct at time point T+1.

H8b. Affective trust at time point T has a positive effect on the same construct at time point T+1.

3.7 Carryover effect of behavioral intentions

We should expect that consumer relationships with specific websites will evolve as consumers have more experiences with a product or service over time, thereby guiding subsequent intentions (Fazio *et al.*, 1989). In other words, behavioral intentions are formed based on accumulated experience and are expected to last over time (La and Choi, 2012; Mittal *et al.*, 1999). Thus, we argue that behavioral intentions at time point T should be differentially changed over time (Ha and Janda, 2011) because longer time intervals allow more opportunities to strengthen an intention to be performed. Thus:

H9. Behavioral intentions at time point T has a positive effect on the same construct at time point T+1.

3.8 Mediating role of two types of trust

Trust (cognitive and affective trust) is dynamic and changes over time (Golbeck and Halaschelk-Wiener, 2009; Tang *et al.*, 2012). As trust has a dynamic characteristic for predicting consumer behavior, the effect of trust should be enhanced over time, if a consumer has a long-term relationship with a specific website. Based on our research hypotheses (see, *H2a* and *H5a*; *H3a* and *H6a*), it is possible to demonstrate that the two types of trust (cognitive and affective trust) can play a mediating role in bridging the relationship between SNS information perceptions and behavioral intentions at time T+1. Such an approach is reasonable, because the strength of relationship performance between the two parties can be mediated by cognitive or affective-based trust (Levin and Cross, 2004). Furthermore, Yang *et al.* (2009) demonstrate that research is needed which matches behavioral processes with the two types of trust in a mediation role because one or the other may be more salient for different behavioral processes. Thus, our expectations regarding the mediation hypotheses of two types of trust are applied as such in the online context. Further, even though the direct relationship between SNS information perceptions and behavioral intentions at time T+1 changes insignificantly, the mediating role of the two types of trust is likely to enhance over time. This is because trust is a strong emotional bond between the two parties over time (Shemwell *et al.*, 1998). The degree to which the trust is positively changed depends on his/her experience with the website. If so, we demonstrate that trust in both its manifestations is key in mediating relationships between SNS information perceptions and behavioral intentions at time T+1, because SNS performs a form of continual verification of the subject of trust over time (e.g. Jonker and Treur, 1999), implying that it ultimately enhances behavioral intentions through the mediating role of the two types of trust. In line with these observations, we formulate the following hypotheses to address the changes through the mediation of the two types of trust. Thus, the final hypotheses are proposed:

H10a. The relationship between SNS information perceptions and behavioral intentions is fully mediated by cognitive trust at time T+1, rather than time T.

H10b. The relationship between SNS information perceptions and behavioral intentions is fully mediated by affective trust at time $T+1$, rather than time T.

4. Methodology

4.1 Sampling and data collection procedures

We chose online open markets, where there are no rules about how much of something people can buy or sell (e.g. top three markets in Korea such as Auction.co.kr, G-market.co.kr, 11st.co.kr, etc.), as our population of interest because customers in these types of markets have had a variety of shopping experiences with a particular website. In so doing, the book, electronic, clothing, and e-travel business contexts were utilized for data collection because these sectors are rated among the top product or service categories purchased via the internet (Ha and Perks, 2005).

Keeping in mind that our study was focussed on temporal changes in the constructs of interest, the main criteria for selecting participants for the sample were: first, a minimum of one year's experience shopping on the internet; second, a minimum of six months' SNS experience (e.g. with one of three major networks such as Twitter, Facebook, and Kakao Talk) within that period; and third, at least one purchase in the online open markets before the initial survey at time point T.

The data used in this study were accomplished through an e-mail survey of 1,484 alumni of a national university in Korea. We sent an e-mail to all individual alumni for checking e-mail usage and against our research criteria before we determined that 1,484 alumni would be contacted to conduct the main survey.

The study was fielded at two points in time that were approximately 14 months (T and $T+1$): January-February and February-March of the following year. Although online consumer behavior is likely to change in less time, we used 14 months of survey duration to ensure adequate change would have taken place to be detectable through the survey questions. The long-term methodological approach has been shown to be much better for predicting consumer behavior, rather than short-term approach (Singer and Willett, 2003). Furthermore, a complete understanding of consumer behavior in the consumption system requires a long-term survey duration at least over one year or even two years (see, Ha and Janda, 2011; Johnson *et al.*, 2006; Mittal *et al.*, 1999).

The questionnaire at time point T was delivered through e-mails, and each respondent was contacted twice. At time point T, 1,042 respondents were selected from the original sample of 1,484 alumni who actually made purchases from a particular online shopping category. The sample size was reduced because 297 alumni had not responded. Another 145 respondents were removed from the sample because of high levels of missing data and outliers. Respondents were asked to evaluate their SNS information perceptions just after they completed their purchase (a specific transaction) on the online shopping mall and then were asked to do the same thing after they made another purchase on the same shopping mall after a certain time.

At time point $T+1$, the survey was e-mailed to 1,042 respondents 12-13 months after their initial survey at time point T. Participants were asked to relate the survey with the same website when they took part in the survey at time point T. To increase the sample size, we decided to follow-up with respondents who were unwilling or unable (due to time inconvenience or e-mail address change) to complete the survey, but were agreeable to being contacted later on the telephone. This was because one of the difficulties encountered when conducting a longitudinal study is the low response rates (Poon and Swatman, 1999).

At time point $T+1$, 341 respondents were willing to cooperate (response rate 22.9 percent: the original sample, $n = 1{,}484$). There were several reasons why participation in the survey drastically dropped at time point $T+1$ (e.g. e-mail address and telephone number changes, survey indifference, and troublesomeness). All respondents received an incentive (mobile voucher worth US$10) offered by the research team. After excluding the respondents with too many missing values, 313 respondents remained in the final sample.

The sample exhibited the following demographic characteristics: 49.7 percent of the respondents were women, 46.8 percent were between 26 and 30 years of age, and 10.3 percent held post-graduate degree; 57 percent of the sample had experienced online shopping with a particular website for at least two years.

4.2 Checks for respondent and measure bias

We employed two checks to assess respondent and measurement bias. First, we identified the 701 respondents ($1042 - 341 = 701$) who did not participate at time point $T+1$. No significant demographic differences were found between this non-respondent group and our final respondents and this sample. Second, we obtained an additional random sample of 100 respondents who did not participate in the study. We compared our final sample of 313 respondents with this group of 100 non-study respondents. The demographic profiles of these non-study 100 respondents were also not significantly different from the profiles in our study's sample. Furthermore, the ratings on the SNS information and intention scales did not differ significantly ($p > 0.10$) from our sample at time points T and $T+1$.

4.3 Measures

As shown in Table I, the three constructs were measured by 15 questions using a five-point Likert scale (ranging from not at all to completely) that was adapted from published scales. Cognitive trust was measured with five items that were adapted from Dabholkar *et al.* (2009). These items are applicable to trust in an advisor who has given specific advice. As Van Slyke and Collins (1996) have demonstrated, the dynamics of trust building should be related to the user's cognitive knowledge based on a lot of sources. Affective trust was also measured with five items that were adapted from Dabholkar *et al.* (2009). Behavioral intentions were measured with five items that were adapted from Johnson *et al.* (2006). Measures of perceptions of SNS information were developed in this study because appropriate scales were not available. Respondents rated the construct ranging 1 "not at all" to 5 "completely." Using established psychometric procedures (e.g. Churchill, 1979), the scale was purified and prepared for data collection. The final scale was pre-tested with 42 individuals with similar demographic profiles as the sample prospects, but, who were not part of the study sample.

4.4 Comparison of measurement

In both T and $T+1$ surveys, the same questions on SNS information perceptions, cognitive and affective trust, and behavioral intentions were asked. The mean, standard deviations, and coefficient αs of the scales for T and $T+1$ are reported in Table II. According to the pairwise t-test, the mean of affective trust did not change significantly from T to $T+1$. However, the means of the other three constructs had significant increases ($p < 0.05$), indicating that there can be substantial changes in scores over time. Coefficient αs reveal that the scales were reliable at both time points T and $T+1$ (Nunnally, 1978).

Scales	Item loading T	Item loading T+1
SNS information perceptions (T: AVE = 0.79, CR = 0.98; T+1: AVE = 0.76, CR = 0.96)		
The information through SNS is helpful to evaluate a particular website shopping mall	0.93	0.87
It is helpful for my shopping to obtain the information about a particular web shopping mall through SNS	0.92	0.94
The information through SNS is very desirable for online shopping activity	0.82	0.79
Cognitive trust (T: AVE = 0.51, CR = 0.91; T+1: AVE = 0.59, CR = 0.93)		
Even when the shopping mall advice seems questionable, I am confident that the website advisor is telling the truth	0.64	0.68
I think this shopping mall service would keep the promises made to me	0.60	0.66
I know that the information given to me is based on the shopping mall advisor's best judgment	0.66	0.69
I trust this advisory service because web shopping mall advisors seem to be very dependable	0.83	0.88
I can count on the web shopping mall advisor to be sincere	0.82	0.89
Affective trust (T: AVE = 0.53, CR = 0.93; T+1: AVE = 0.57 CR = 0.94)		
In all circumstances, the web shopping mall advisor is ready to offer me assistance and support	0.68	0.64
When giving advice, the web shopping mall advisor is concerned about my welfare	0.73	0.76
In the future, I can count on the online shopping mall service to consider how the shopping mall's decisions and actions will affect me	0.63	0.70
I trust this advisory service because web shopping mall advisors seem to care about their customers	0.85	0.86
When it comes to things that are important to me, I can depend on the support provided by this advisory service	0.74	0.79
Behavioral intentions (T: AVE = 0.51, CR = 0.89; T+1: AVE = 0.51, CR = 0.90)		
Next time I will definitely buy anything from the web shopping mall again	0.69	0.73
If I lost my product, I will definitely buy it from the web shopping mall again	0.66	0.68
If every online shopping mall sold any product for free, I would choose this shopping mall	0.55	0.61
I recommend this shopping mall to other people	0.88	0.84
I talk to other people about this shopping mall	0.76	0.69

Note: CR, composite reliability

Table I.
Scale indicators and CFA results

Variable	Mean T (SD)	Mean T+1 (SD)	α T	α (T+1)
SNS information	2.97 (0.98)	3.14 (0.97)	0.91	0.90
Cognitive trust	2.94 (0.81)	3.04 (0.79)	0.83	0.87
Affective trust	2.96 (0.82)	2.98 (0.80)	0.84	0.86
Behavioral intentions	3.18 (0.96)	3.26 (0.89)	0.84	0.83

Note: $n = 313$

Table II.
Mean (SD) and coefficient α's for scales at T and T+1

5. Estimation results

In this section, we discuss our estimation results from AMOS 7. We start with describing the model fit for the two time points. Later, we discuss the estimation results for the proposed model with temporal effects.

Before testing a confirmatory factor analysis (CFA), we analyzed an exploratory factor analysis (EFA). The EFA on 18 items at times T (SNS information perceptions: 1.91; cognitive trust: 1.04; affective trust: 6.19; behavioral intentions: 2.37) and $T+1$ (SNS information perceptions: 1.51; cognitive trust: 1.07; affective trust: 6.69; behavioral intentions: 2.28), yielded four factors with eigenvalues greater than 1 and explaining 64.28 percent of the total variance at time T and 64.17 percent at time $T+1$.

More specifically, factor loadings of the four constructs at time T were as following: SNS information perceptions (0.85, 0.87, 0.77), cognitive trust (0.61, 0.58, 0.65, 0.59, 0.71), affective trust (0.63, 0.67, 0.64, 0.76, 0.69), and behavioral intentions (0.65, 0.60, 0.55, 0.68, 0.58). KMO (0.81) and BTS (2726.614) were supported at $p < 0.01$. Factor loadings of the same construct at time $T+1$ were as following: SNS information perceptions (0.83, 0.89, 0.75), cognitive trust (0.58, 0.75, 0.62, 0.54, 0.64), affective trust (0.57, 0.66, 0.52, 0.68, 0.60), and behavioral intentions (0.63, 0.61, 0.51, 0.75, 0.63). KMO (0.89) and BTS (2792.839) were supported at $p < 0.01$. These four factors at time points, T and $T+1$, were both conceptually and operationally consistent with the conceptual domain of each construct.

5.1 Model fit

The overall $\chi^2(\text{df} = 566) = 1099.737$ ($p < 0.0001$) is significant. As shown in Table I, the CFA overall fit is acceptable (CFI = 0.915, IFI = 0.916, TLI = 0.906, RMSEA = 0.055). Relative to the other indices, TLI performs the best followed by RMSEA. Sharma *et al.* (2005) recommended that the structural equation model with a sample size greater than 200 should be tested with the TLI to evaluate model fit because TLI performs the best as long as the size of factor loadings is 0.5. Both TLI and RMSEA estimates are acceptable with our data.

We assessed convergent validity by examining the magnitude, direction, and statistical significance of estimated standardized factor loadings (Anderson and Gerbing, 1988). They are all significant and positive (see Table I). Furthermore, this study confirms acceptable the average variance extracted (AVE), as per Gerbing and Anderson (1992). Then, we calculated the composite reliability as: (square of the summation of the factor loadings)/[(square of the summation of the factor loadings) + (summation of error variables)]. Composite reliability for all factors at times T and $T+1$ was above 0.80 (see, Table I). The analysis also found satisfactory discriminant validity. Fornell and Larcker (1981) suggest that the AVE of any two constructs should be greater than their squared correlation. Table III provides the supportive evidence.

5.2 Overall model evaluations

Results of structural equation modeling of the proposed model revealed a χ^2 of 1131.594 (df = 578; $p < 0.0001$), CFI of 0.912, TLI of 0.904, IFI of 0.913 and RMSEA of 0.055.

Variable	1	2	3	4	5	6	7	8
1. SNS information perceptions (T)	*0.79*							
2. Cognitive trust (T)	0.18	*0.51*						
3. Affective trust (T)	0.20	0.69	*0.53*					
4. Behavioral intentions (T)	0.26	0.51	0.49	*0.51*				
5. SNS information perceptions ($T+1$)	0.32	0.08	0.10	0.04	*0.76*			
6. Cognitive trust ($T+1$)	0.01	0.34	0.20	0.14	0.18	*0.59*		
7. Affective trust ($T+1$)	0.07	0.26	0.30	0.14	0.33	0.65	*0.57*	
8. Behavioral intentions ($T+1$)	0.04	0.15	0.19	0.30	0.21	0.59	0.63	*0.51*

Note: The AVE is presented in italic characters

Table III.
Discriminant validity analysis

The overall model fit was acceptable. The squared multiple correlations for the structural equations were as follows: cognitive trust (T), 13 percent; affective trust (T), 63 percent; behavioral intentions (T), 30 percent; SNS information perceptions (T+1), 10 percent; cognitive trust (T+1), 15 percent; affective trust (T+1), 63 percent; behavioral intentions (T+1), 46 percent. Thus, a substantial proportion of variance in each of these constructs is explained.

As depicted in Figure 1, the most interesting finding is the role of affective trust at time point T. There are no direct effects of both SNS information perceptions-affective trust ($\beta = 0.06$, $p > 0.05$) and affective trust-behavioral intentions ($\beta = 0.21$, $p > 0.05$), but the relationship between SNS information perceptions and behavioral intentions ($\beta = 0.16$, $p < 0.01$) is significant. Based on these findings, we suggest that there are two significant implications for the development of online trust. The mediating role of cognitive trust between SNS information perceptions and behavioral intentions is significant. On the other hand, the mediating role of affective trust between SNS information perceptions and behavioral intentions is initially insignificant. This unexpected result may point to the crucial role of cognitive trust at time point T. Affective trust has not been well developed at time point T, but the effect of cognitive trust bridges SNS information perceptions and behavioral intentions at time point T.

At time point T+1, the effect of affective trust has been developed and enhanced more than that of cognitive trust (SNS→cognitive trust, $\beta = 0.15$, SNS→affective trust, $\beta = 0.20$; cognitive trust→behavioral intentions, $\beta = 0.26$, affective trust→behavioral intentions, $\beta = 0.40$). However, the direct relationship between SNS information perceptions and behavioral intentions at time point T+1 is not supported ($\beta = 0.03$, $p > 0.05$). The direct effect of SNS information perceptions on behavioral intentions is not significant at T+1, as it had been at T. Over time, the indirect effect through affective trust has become stronger.

5.3 Temporal effects

To better understand the proposed model, we compared the same path of each relationship at time point T with the corresponding same relationship at time point T+1. As shown in Table IV, the temporal effects remain unchanged for three of the six proposed paths between the four constructs: SNS information perceptions to cognitive trust, cognitive trust to affective trust and cognitive trust to behavioral intentions. On the other hand, while the effect of SNS information perceptions were significant at T, they changed to insignificant at T+1. Also, while SNS information perceptions had insignificant effect on affective trust and affective trust had insignificant effect on behavioral intentions at T, these two effects were significant at T+1.

Among the most important findings in comparing the effects at T vs T+1, for the linkage of affective trust-behavioral intentions, the temporal effect increased by

Paths	T	Significant in T	Change from T to T+1	Significant change?	Support
SNS information perceptions →behavioral intentions	0.16	yes	−0.13	yes	*H1a* and *H1b*
SNS information perceptions →cognitive trust	0.18	yes	−0.03	no	*H2a*
SNS information perceptions →affective trust	0.06	no	0.14	yes	*H3b*
Cognitive trust →affective trust	0.78	yes	−0.06	no	*H4a*
Cognitive trust →behavioral intentions	0.31	yes	−0.05	no	*H5a*
Affective trust →behavioral intentions	0.21	no	0.19	yes	*H6b*

Table IV. Changes in path coefficients

almost twice, whereas for the SNS information perceptions-behavioral intentions linkage, the temporal effect significantly dropped from 0.16 to 0.03. Meanwhile, the temporal effect of the SNS information perceptions-affective trust linkage, remarkably, increased by almost three times. The important conclusion here is that the role of affective trust becomes significant over time while the direct effect of SNS information perceptions have all but disappeared.

Overall, hypotheses *H1b*, *H3b* and *H6b* that proposed temporal effects were supported. But, both relationships between cognitive trust and affective trust (*H4b*) and between cognitive trust and behavioral intentions (*H5b*) were not supported. *H2b* is not supported, because the temporal change (−0.03) from T to T+1 was insignificant.

5.4 Carryover effects

The carryover effects were the most impressive in the study. As shown in Figure 1, *H7*, *H8a*, *H8b*, and *H9* that propose carryover effects were significantly supported. That is, all carryover effects from time point T to T+1 are significant. The largest carryover effect is for SNS information perceptions (0.32), followed by cognitive trust (0.31), behavioral intentions (0.20), and affective trust (0.10). Of these four carryover effects,

it appears that cognitive trust transfers more than affective trust. This explains why affective trust did not show a significant difference between T and T+1.

5.5 Mediating effects of two types of trust

The mediating effects of both cognitive and affective trust at time T+1 were also interesting. *H10a* and *H10b* proposing mediating effects were significant. Particularly, as the direct relationship between SNS information perceptions and behavioral intentions at time T+1 is insignificant (SNS→behavioral intentions, $\beta = 0.03$, $p > 0.05$), both types of trust played a strong and full mediating role in bridging the relationship between the two constructs, indicating that *H10a* and *H10b* are supported. More specifically, cognitive trust at time point T+1 fully mediates the effect of SNS information perceptions on behavioral intentions ($\beta = 0.039$, $p < 0.05$). Similarly, affective trust at time point T+1 fully mediates the effect of SNS information perceptions on behavioral intentions ($\beta = 0.080$, $p < 0.01$).

According to the theory of mediator effects in consumer psychology (Frazier *et al.*, 2004), this result would suggest that the reason SNS information perceptions is effective is that it increases both affective and cognitive trust at time T+1. Furthermore, the result of *H10b* is remarkable because the mediating effect of affective trust is insignificant at time T. This result is consistent with the strength of affective trust from time point T to time point T+1.

6. Discussion

In this section, we first discuss the theoretical and managerial implications of our findings. We conclude with an acknowledgment of the limitations of our study and offer suggestions for future research.

6.1 Theoretical implications

Results of the first study at time point T provide evidence that perceptions of SNS information directly affect behavioral intentions and cognitive trust, and that cognitive trust directly effects affective trust and behavioral intentions. The results also suggest

that SNS information perception effects upon both affective trust and behavioral intentions are mediated through cognitive trust.

Results of the second study at time point $T+1$ show support for similar direct and full mediated effects except that there is no direct effect of SNS perceptions upon behavioral intentions, and at time point $T+1$ there does exist a direct effect of SNS perceptions upon affective trust and an indirect effect upon behavioral intentions mediated through affective trust. Thus, the second study provides evidence that SNS directly affects cognitive and affective trust, that both cognitive and affective trust directly affect behavioral intentions, and that cognitive trust directly affects affective trust.

The time point $T+1$ results also provide evidence that carryover effects exist for all four constructs. Recent longitudinal studies show that behavioral intentions are dynamic and change over time (e.g. Ha and Janda, 2011; Webb and Sheeran, 2006). However, these studies have mainly focussed on behavioral or loyalty intentions and empirical studies that explore behavioral intentions based on consumer perceptions of information received from other customers' interactions in SNS are limited. Furthermore, our longitudinal test results suggest that the relationships between SNS information perceptions and cognitive trust, between cognitive and affective trust, and between cognitive trust and behavioral intentions, do indeed persist over time.

A final and important theoretical take away from the study is that carryover effects are significant and confirmed previous studies albeit in a different context (cf. Trusov *et al.*, 2009; La and Choi, 2012). Carryover effects in all four constructs (SNS information perceptions, both dimensions of trust, and behavioral intentions were significant.

Based upon these results and those of Chen *et al.* (2013) and McCole *et al.* (2010), we conclude that there is theoretical support for the influence of both cognitive and affective trust on behavioral intentions. These findings confirm Johnson *et al.*'s (2006) study that addresses the importance of the affective construct when marketers want to improve market performance over time. The other theoretical implication with regard to the bi-dimensional nature of trust is that cognitive trust has significant influence on affective trust, similar to the findings of Komiak and Benbasat (2006). We find that perceptions of information on SNS are more likely to have a significant impact on cognitive trust, rather than on affective trust.

Our results also suggest that perceptions of information received from SNS have an initial direct influence on shopping intentions, confirming the findings of Nitzan and Libai (2011) and Naylor *et al.* (2012). However, these direct effects decrease over time. Temporal effect findings in our study suggest that over time, behavioral intentions tend to be less influenced by SNS information perceptions and cognitive trust and more influenced by affective trust. Our findings regarding temporal effects also suggest that the influence of SNS information perceptions on cognitive trust is gradually replaced by an increasing role on affective trust.

6.2 Practical implications

Managerial implications of our findings are that companies that use online shopping advisers must be certain that customers' information perceptions are good from the very beginning and from the first exposure the prospective customer has to the website. While online shopping sites that allow un-moderated conversations will risk negative reviews on their website, on the other hand, those that have their own advisors/reviewers will need to ensure that their reviewers are knowledgeable and provide unbiased advice. In either case, it would behoove the company to closely monitor the shopping site. Building trust is critical – at first, cognitive trust appears to

be paramount and as time goes by, the shopper should develop affective trust with the shopping site. Over time, the website should take advantage of those shoppers that have affective trust with the shopping site. These shoppers will tend to have the more favorable behavioral intentions on the site. To do so, online shopping malls need to keep track of SNS activity and determine ways of building knowledgeable and unbiased blogging activity that first build cognitive trust and later transform this trust into affective trust, which appears to have the most impact on behavioral intentions in the long term.

6.3 Limitations and future research directions

The limitations of this study include those related to the sample and the context. This study was conducted in one particular culture and with alumni of one particular university. While the non-bias test revealed no sample bias, the question remains whether the results would be similar if the study were conducted on a general population sample and in a different culture. A more representative sample would be an improvement in a future study that also tests the relationships between the constructs in different cultures. This study was conducted in the context of the online shopping mall and cannot be extrapolated to other contexts such as virtual teams, for example. Future research could explore whether the relationships between cognitive and affective trust and the carryover effects are also true in virtual teams. With more intra-firm business transactions and relationships being conducted online, it may be useful to investigate how perceptions of the information shared between team members might affect cognitive and affective trust among team members and the consequent impact on team performance.

True longitudinal studies take time. This study was conducted over a 14-month time period. One could take more snapshots and take more measures over a longer time period to discover the temporal effects with more robust results. Moreover, replication studies that control for other market effects upon the influence that SNS information perceptions exert upon behavioral intentions over time would be useful. Finally, the context could be broadened to cover different online service experiences beyond the online shopping experience.

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