



## Signaling effect of website usability on repurchase intention

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### ABSTRACT

After-sale service quality is a key to differentiating an online seller from numerous others and attracting returning customers. However, new customers cannot readily discern the quality of unfamiliar sellers. Sellers often try to reduce the information asymmetry and signal their quality by ensuring good website interface usability, considering that the website is the main point of contact with online shoppers. Most research on signaling has focused on its pre-purchase effects. Although researchers have argued that signaling could affect future purchase decisions, how signaling influences repurchase intention has not been detailed. This study proposes a model of the influence based on the signaling theory and expectation-confirmation model. The model posits that a signal influences an online shopper's expectation and the expectation-confirmation subsequently determines repurchase intention. The model was tested with pre-purchase and post-purchase data collected in a two-stage survey and analyzed with structural equation modeling. Findings indicate that signaling goes beyond the pre-purchase stage of initial purchase to influence repurchase intention. This indicates that signaling has longer-term effect than that typically examined in signaling research and further research on the effect is needed. For practice, the findings indicate that online sellers need to send realistic signals to attract returning customers.

### 1. Introduction

To ensure continual profitability, online sellers must acquire new customers and convert them into repeat, repurchasing customers (Kim, Ferrin, & Rao, 2009; Shin, Chung, Oh, & Lee, 2013). The number of consumers shopping online in the United States is forecasted to grow to 270 million in 2020. This is expected to lead to online sales amounting to \$523 billion, which is a 56% increase from that in 2015 (Forrester Research Incorporated, 2015). While the increase in online shoppers presents great opportunities, acquiring and retaining new customers remain challenging for many online sellers (Fang, Wen, George, & Prybutok, 2016; Shin et al., 2013).

A key challenge in acquiring new customers is overcoming information asymmetry, which is the situation in which one party has less information than the other in a transaction (Mavlanova, Benbunan-Fich, & Koufaris, 2012). When shoppers encounter an unfamiliar online seller, they tend to lack information to accurately assess the seller's qualities and they are more hesitant to purchase (Schlosser, White, & Lloyd, 2006). This is further exacerbated by the fact that online shopping is fully mediated by websites and there is often a greater time lag between order and fulfillment compared to offline shopping. Online shoppers can only fully assess the qualities of an unfamiliar seller after

they commit to pay and experience how their order is fulfilled. For example, prior to making a purchase, a shopper cannot accurately evaluate sellers' after-sale service quality. To avoid the risk of running into a poor-quality seller and bad experience, the shopper may decide not to purchase. To mitigate this, sellers often try to reduce the information asymmetry by conveying information about their qualities.

Signaling is an effective way for conveying information and reducing the information asymmetry between online sellers and their new customers (Li, Fang, Wang, Lim, & Liang, 2015). Signals are observable, extrinsic cues that can convey credible information regarding sellers' unobservable qualities (Schlosser et al., 2006; Wells, Valacich, & Hess, 2011). Signals commonly used in online stores include those related to observable aspects of a website, reputation, and warranty (Li et al., 2015; Mavlanova, Benbunan-Fich, & Lang, 2016; Zhang, Li, Yan, & Johnston, 2017). These signals seek to assure new customers (i.e., the less-informed party) that the seller is of good quality. They are expected to influence new customers' beliefs and purchase decisions. Among them, website-interface-related signals, such as website quality, website design investments, and comprehensiveness of information (Li et al., 2015), are technology artifacts that are of particular interest to electronic commerce and information systems research. Therefore, we focus on website-interface-related signals in this study.

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**Table 1**  
Preview of Study Contributions.

State of the Literature and Practice	This Study's Contribution	Relevance	
		Theory/ Empirics	Practice
Website-interface-related signals influence <i>pre-purchase</i> beliefs such as expected company (i.e., seller) quality, expected product quality, trust, and purchase intention (Li et al., 2015; Wells et al., 2011)	<ul style="list-style-type: none"> <li>- Signals have significant influence <i>beyond the pre-purchase stage</i>, on repurchase intention</li> <li>- The effect can be explained in terms of the expectation-confirmation theory</li> </ul>	✓	✓
Signaling effects have been empirically assessed in cross-sectional studies, focusing on the pre-purchase stage (Li et al., 2015; Wells et al., 2011)	The proposed model was empirically assessed with longitudinal data collected in a two-stage survey (before and after a purchase)	✓	
Expected service quality is compared vis-à-vis actual service quality to determine satisfaction and subsequently repurchase intention	The formation of expected service quality is affected by website usability (an observable aspect of websites), through signaling	✓	✓

The focus of signaling research has been on signals' effects on pre-purchase beliefs (e.g., *expected seller quality*; review detailed in Section 2.1) but researchers have argued that signaling could go beyond the pre-purchase stage to influence future purchase decisions, such as repurchase intention. Besharat (2010, p. 1242) argued that "signal acts as an indicator that reduces the likelihood of a bad outcome for the buyer...Otherwise, consumers will punish the brand by choosing not to *repurchase*". Dutta and Biswas (2005, p. 76) stated that "signal default might lower consumer *repurchase* intention". Kirmani and Rao (2000, p. 70) argued that "*repeat* purchase is likely to occur only if the claims about unobservable quality are true". At the same time, the expectation-confirmation theory (Parasuraman, Zeithaml, & Berry, 1985) indicates that pre-purchase *expectation* of sellers' service quality influences satisfaction and subsequently *repurchase* intention, depending on whether the expectation is met (i.e., confirmed). Accordingly, we propose that a possible theoretical mechanism through which signaling affects online shoppers' repurchase intention is website-interface-related signal → expectation of sellers' service quality → expectation confirmation → satisfaction → repurchase intention.

It is important for online sellers to signal their service quality to new customers because service quality affects online shoppers' willingness to purchase (Lee & Lin, 2005; Udo, Bagchi, & Kirs, 2010). Service quality is also an important determinant of *repurchase* decisions in that it helps a seller differentiates itself from other competitors. Sellers' service quality refers to the adequacy of after-sale service and support (e.g., order processing, delivery, security, convenience; Chiu, Wang, Fang, & Huang, 2014). Exemplary service is the next sale in the making and service quality can be a more important order winner than product quality (Abby, Simon, & Matthew, 1994). In online shopping, shoppers can compare the offerings of competing stores instantaneously with little effort and competitors are only a few clicks away (Srinivasan, Anderson, & Ponnayolu, 2002). There has been a trend of commoditizing products, which emphasizes cost reduction over brand differentiation (Mathwick, Malhotra, & Rigdon, 2001). Given that product quality and price are relatively easy to imitate by competitors in electronic commerce, signaling service quality may be more fruitful for attracting new customers, fostering strong relationships, and turning them into repeating customers.

Since signaling seeks to convey information to online shoppers (Schlosser et al., 2006; Wells et al., 2011), it is important to account for shoppers' information need when studying the effect of signaling. Shoppers who have a greater need for information are likely to be more strongly affected by signals. Research on consumers' information seeking behavior shows that shoppers' information need is mainly determined by the perceived risk of a purchase and their prior online shopping experience (Aljukhadar & Senecal, 2016; Grant, Clarke, & Kyriazis, 2007; Mitra, Reiss, & Capella, 1999; Murray, 1991; Park & Stoel, 2005; Schmidt & Spreng, 1996; Shin et al., 2013). Similarly, in a study of signaling, Wells et al. (2011) suggests that information asymmetry, characterized by pre-purchase information scarcity and post-purchase information clarity, can vary depending on the extent to

which the shopper is experienced. Therefore, in the proposed model, we consider the moderating effect of online shoppers' information need in terms of their perceived risk of a purchase and prior online shopping experience.

In sum, this study looks beyond the pre-purchase effects of signaling and our objective is to model and assess the effect of signaling on *repurchase* intention. We hypothesize that website interface usability signals service quality and the signaling effect is moderated by shoppers' information need. The resultant service quality expectation should influence repurchase intention, to the extent that it is confirmed and shoppers are satisfied, as posited by the expectation-confirmation theory. We assessed the proposed model with data collected in a longitudinal, two-stage survey of 213 online shoppers and found strong empirical support. This study contributes to research by (1) revealing that signaling has a longer-term effect than that typically examined in signaling research, (2) explaining the theoretical mechanism through which signaling affects repurchase intention, and (3) identifying website usability as a significant and manageable factor influencing the formation of service quality expectation in online shopping. For practice, this study shows that signaling is more important than expected in that it affects the initial purchase as well as future purchases. This study's contributions to research and practice are summarized in Table 1.

## 2. Conceptual background

In this section, we first explain the nature of signals and how they convey unobservable information and influence shopper' expectation in the pre-purchase stage, based on the signaling theory. This is followed by a discussion of website usability as a website-interface-related signal in online shopping. The information need of online shoppers is then described. We also provide an overview of the expectation-confirmation theory, which is useful for explaining how repurchase intention is formed based on pre-purchase expectation.

### 2.1. Signaling theory

The signaling theory posits that signals can help to reduce information asymmetry between sellers and buyers in the *pre-purchase* stage of a transaction (Kirmani & Rao, 2000). Buyers often lack information to accurately assess unfamiliar sellers' quality prior to making a purchase. Signals are observable cues that can convey information about sellers' true quality to buyers. Signals are generally extrinsic and can be confidently assessed by potential buyers (Richardson, Dick, & Jain, 1994). Extrinsic cues are related but not inherent to the quality being signaled. For example, to signal after-sale service quality, the ease of use of a website and depth of product information provided would be extrinsic cues, while the size of customer service staff would be an intrinsic cue. The latter is intrinsic because altering it will change after-sale service quality directly. A signal with high confidence value is one that can be used and judged by shoppers

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