The impact of social commerce feature richness on website stickiness through cognitive and affective factors: An experimental study

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Abstract

Website stickiness, which describes how much attention a website receives from its users, is a critical success factor for e-commerce websites. While many e-commerce websites are currently integrating social commerce features to enhance consumers' shopping experience, little is known about how such features affect the website stickiness, especially when used in combination. Building upon the *stimulus-organism-response* (S-O-R) paradigm, we develop a research model to explain how social commerce feature richness affects the website stickiness through consumers' perception of cognitive and affective factors. The research model is evaluated in a controlled online experiment, in which 164 participants used variants of an e-commerce website with varying levels of social commerce feature richness. The results indicate that the feature richness positively affects cognitive and affective factors, which in turn increase the website stickiness. This implies that e-commerce websites can be made more successful when using functionally diverse social commerce features in combination.

Keywords

Electronic commerce, social commerce, feature richness, website stickiness, perceived usefulness, perceived enjoyment, trust, consumer behavior

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1. Introduction

Designing an effective e-commerce website that attracts and retains consumers is a major challenge for online businesses (Chen et al. 2010; King et al. 2016). In highly competitive online environments, consumers can easily search for product information, compare prices, and switch from one website to another with only a few clicks (Brown et al. 2003; Srinivasan et al. 2002). This makes it difficult for online businesses to keep consumers on their websites (Cao et al. 2005). In such environments, the *website stickiness* is considered as a critical determinant for the success of e-commerce websites (Li et al. 2006; Zott et al. 2000). Briefly defined, website stickiness refers to how much attention a website receives from its users over time (Davenport 2000). On sticky websites, consumers typically spend more time and interact more with the website, which increases the likelihood of purchases and nurtures customer loyalty (Lin 2007; Lin et al. 2010). It is thus important for online businesses to understand how to increase the stickiness of their websites (Li et al. 2006).

Various studies in the e-commerce and marketing domain indicate that augmenting an e-commerce website with features such as a product search engine or product images can positively affect the website stickiness (Bansal et al. 2004; Benlian 2015; Danaher et al. 2006). Inspired by the success of social networking websites, many companies have begun integrating social commerce features into their e-commerce websites to increase their attractiveness for consumers (Huang and Benyoucef 2017). *Social commerce features* involve "a software artifact that is integrated into a website and that provides a specific social media-based functionality to promote and support interactions among consumers" (Friedrich et al. 2016, p. 3). Prominent examples of social commerce features are rating and review tools, social wish lists, community feeds, and social profile pages (Curty and Zhang 2013; Huang and Benyoucef 2015).

By using social commerce features, consumers can create and share product relevant information, which can support the making of purchase decisions (Mikalef et al. 2017). For instance, by using rating and review tools, consumers can read other consumers' opinions about a product or service before making their purchase decisions. The information that is created and shared by consumers is also referred to as *social information* (Cheung et al. 2014; Yadav et al. 2013). As such information can help consumers in their decision-making, they will ideally spend more time on websites that provide social commerce features.

Social commerce features differ from each other with respect to the provided functionality and the transmitted kind of social information, however. By integrating functionally diverse social commerce features in combination, e-commerce websites can hence provide consumers different kinds of social information, which in turn may be useful during different stages of the purchase decision-making process (Huang and Benyoucef 2017). We

use the term *social commerce feature richness* to refer to the functional diversity of a feature set. Assuming that different kinds of social information can support different stages of the purchase decision-making process, it appears plausible that websites with a higher social commerce feature richness will be more effective in retaining consumers (Curty and Zhang 2013; Huang and Benyoucef 2013).

Yet, functionally richer sets of social commerce features could also overwhelm consumers with information overload so that they will spend less time on the website, resulting in a decreased website stickiness (Hsu and Liao 2014; Park and Lee 2008). To ensure the success of social commerce initiatives, it becomes hence important to understand if and how functionally diverse social commerce features should be used in combination and what impact such endeavors may create.

Yet, although literature provides initial evidence that a positive causal relationship may exist between the provisioning of individual social commerce features and the average time consumers spend on a website (Olbrich and Holsing 2011), the effects of social commerce features on the stickiness of e-commerce websites have not yet been explored in detail. The present literature hence does not explain why social commerce features may influence the stickiness of website. While consumers' perception of cognitive and affective factors, such as perceived usefulness, perceived enjoyment, and trust, seems to play a significant role in the formation of website stickiness (Benlian 2015; Li et al. 2006; Lin 2007), only few studies have examined the effects of social commerce features on these factors. Kumar and Benbasat (2006) have analyzed how rating and review tools affect the perceived usefulness of an e-commerce website. Brengman and Karimov (2012) have studied how like buttons affect consumers' trust in the website providing such a feature.

Other studies have explored how social commerce website characteristics, such as interactivity or personalization, which can be caused by social commerce features, affect cognitive and/or affective factors (Grange and Benbasat 2010; Mikalef et al. 2012; Mikalef et al. 2013; Zhang et al. 2014). The results of the studies indicate that social commerce features may affect cognitive and affective factors differently depending on their functional characteristics. As only specific social commerce features or website characteristics have been investigated, it remains unclear how using functionally diverse sets of social commerce features may affect cognitive and/or affective factors and the resulting website stickiness.

To better understand if and how social commerce feature richness influences the stickiness of an e-commerce website, we present the results of a study, in which we systematically explored the effects generated by functionally richer sets of social commerce features. Our study is guided by two research questions. Since literature has not investigated if the stickiness of an e-commerce website can be strengthened by integrating functionally

richer sets of social commerce features, we want to better understand: *(RQ1) What impact does social commerce feature richness have on the stickiness of an e-commerce website?* To explain the impact of social commerce feature richness, we develop a research model that connects social commerce feature richness to the website stickiness through consumers' perception of cognitive and affective factors. In so doing, we investigate: *(RQ2) How do cognitive and affective factors mediate the relationship between social commerce feature richness and the website stickiness?*

The developed research model we have developed uses the stimulus-organism-response (S-O-R) model as an overarching framework to describe the causal relationship between social commerce feature richness, the cognitive and affective factors, and the website stickiness. We evaluated it by means of a controlled online experiment, in which 164 participants used and reported on several variants of an e-commerce website that differed from each other only with respect to the functional richness of the integrated social commerce features. To measure the website stickiness, we used different website metrics (i.e., number of clicks, page views, visit duration) that we collected from the participants' clickstream data.

The results of our study provide novel contributions to the research stream on website stickiness and on social commerce. On the one hand, we contribute insights to answer the question whether the website stickiness, which is a crucial factor for the success of e-commerce websites, can be strengthened by integrating functionally richer sets of social commerce features. Up to now, this question has not been examined although it is of immediate interest (Huang and Benyoucef 2013). The developed research model introduces the concept of social commerce feature richness as a determinant of consumer perceptions and behavioral responses. In so doing, we provide a novel instrument that can be used to explain the unique effects that are generated when using functionally richer sets of social commerce features. On the other hand, we provide a research model that allows to study how cognitive and affective factors and their interplay mediate the relationship between social commerce feature richness and the website stickiness. So far, early social commerce studies have only focused on studying how specific social commerce features or specific website characteristics can affect cognitive/affective factors. Our research model hence provides a step towards studying the effects of social commerce initiatives from a more holistic perspective.

2. Theoretical background

From a theoretical standpoint, social commerce feature richness can be considered as a stimulus, which may trigger a desired response in a consumer, such as spending more time on a website. To depict this relationship in a structured manner, we adopt the S-O-R model as an overarching framework to develop our research model.

2.1. The S-O-R model

Rooted in the field of environmental psychology, the S-O-R model suggests that certain signals in the environment (stimulus) influence the cognitive and affective states of an individual (organism), and thereby influence the individual's behavior (response) (Mehrabian and Russell 1974). According to the S-O-R model, the cognitive and affective states of the organism mediate the relationship between the stimulus and response. In the e-commerce domain, several studies adopted the S-O-R model to examine how certain website features as stimulus (e.g., product descriptions, pictures, navigation aids) can affect consumers' responses, such as their buying behavior (Brengman and Karimov 2012; Chang and Chen 2008; Eroglu et al. 2001; Parboteeah et al. 2009). Similarly, Benlian (2015) used the S-O-R model to study how different web personalization cues can affect consumers' willingness to stick to a website.

Given the different perspectives of these studies, various factors have been suggested to measure the cognitive and affective states of consumers, such as perceived usefulness, perceived enjoyment, or trust. Judging from the findings of these studies, the S-O-R model not only is well suited to explain how a certain website stimulus such as social commerce feature richness affects the cognitive and affective states of consumers and, in turn, affects a response such as consumers' sticking to a website. By establishing a causal relationship between stimulus, organism, and response, it moreover provides a structured framework to trace the effects caused by social commerce feature richness in a systematic manner.

2.2. Social commerce feature richness as stimulus (S)

In the social commerce literature, initial evidence is given that social commerce features may affect consumers' cognitive and affective states differently depending on their functional characteristics. For instance, Mikalef et al. (2012) as well as Mikalef et al. (2013) explored how different characteristics of social commerce websites can influence cognitive and affective factors and how these factors can affect consumers' browsing intention. According to their results, website characteristics such as providing a convenient shopping experience and a wide product selection can positively affect the cognitive state, while characteristics such as providing information about latest shopping trends and offering a sense of excitement when browsing the website can positively affect the affective state (Mikalef et al. 2012; Mikalef et al. 2013). Grange and Benbasat (2010) as well as Zhang et al. (2014) also provide initial evidence about different characteristics of social commerce websites and their effects on cognitive and/or affective factors. Zhang et al. (2014), for instance, show that the personalization of a social commerce website can trigger stronger affective reactions than the website's interactivity and sociability.

The results of these studies are relevant to our study, since the identified characteristics can be considered as the affordances that stem from the social commerce features of a website. However, while it is suggested that individual social commerce features can influence cognitive/affective factors differently, especially the specific effects that may emerge from the use of functionally diverse sets of social commerce features have not been considered in these studies. Investigating such effects is important to understand whether the use of functionally diverse sets of social commerce features can increase the stickiness of e-commerce websites.

To conceptualize the extent of social commerce functionality that is provided by the social commerce features of an e-commerce website, we introduce the concept of *social commerce feature richness*. We define social commerce feature richness as the *diversity of social media-based functionality being provided on an e-commerce website to promote and support interactions among consumers*. Our conceptualization of feature richness is rooted in the media richness theory, which broadly defines the richness of a communication medium as its capabilities to transmit information (Daft and Lengel 1986). Modern online communication media such as e-commerce websites typically provide several features (e.g., product descriptions, product images, navigation menus, etc.) that enable the transmission of information (Palmer 2002; Simon and Peppas 2004). While media richness according to this example addresses a website's overall information transmission capabilities, which stems from all website features, the concept of social commerce feature richness specifically addresses the range of social information that is transmitted by the social commerce features of a website.

Since a more diverse social media-based functionality can transmit a broader range of social information, which can support different stages of the consumers' decision-making process (Huang and Benyoucef 2017), we expect social commerce feature richness to be an important determinant for the stickiness of the corresponding e-commerce website. Accordingly, social commerce feature richness represents the stimulus in our research model.

To operationalize the abstract concept of social commerce feature richness, knowledge about the functional diversity of social commerce features is required. In this study, we draw on the reference model for the design of social commerce platforms developed by Huang and Benyoucef (2013) to illustrate how social commerce features can be identified and combined according to their functional diversity. However, since literature also discusses other ways to classify social commerce features based on their functionality (Curty and Zhang 2013; Grange and Benbasat 2010), it should be pointed out that our conceptualization of social commerce feature richness is not restricted to this model. The reference model groups social commerce features into four different layers depending on the provided functionality.

The “individual” layer, which provides the basic functionality for all other layers, is composed of features that enable users to represent themselves and to be recognized by others, for instance, by creating social profile pages. The “conversation” layer comprises features that allow users to create content and to share information with others, for instance, in form of product reviews generated through rating and review tools or in form of shares and likes generated through share and like buttons. The “community” layer contains features to build communities and to maintain relationships, for instance, through community feeds or question and answer tools. The “commerce” layer comprises features to facilitate and stimulate commercial activities, for instance, by enabling users to create social wish lists or by generating social product recommendations based on the user interactions. According to Huang and Benyoucef (2013), successful social commerce websites ideally should cover each of the four reference model layers with at least one social commerce feature.

Based on the reference model, we argue that the more layers a set of social commerce features covers, the greater is the functional diversity and the higher is social commerce feature richness. For instance, a feature set that covers the individual, conversation, and commerce layer provides a higher level of social commerce feature richness than a set that only covers the individual and the conversation layer.

2.3. Cognitive and affective factors as states of the organism (O)

To represent the cognitive and affective states (of the organism), we draw on three factors for which solid evidence is given that they can significantly influence the website stickiness (Benlian 2015; Li et al. 2006; Lin 2007; Polites et al. 2012). Moreover, literature indicates that individual social commerce features may have an impact on these factors (Brengman and Karimov 2012; Hajli 2013; Kumar and Benbasat 2006; Liu and Park 2015). These factors are *perceived usefulness*, *perceived enjoyment*, and *trust*. Note that some studies also use the factors utilitarian/hedonic motivation in a conceptually similar manner to perceived usefulness/enjoyment (Mikalef et al. 2012; Mikalef et al. 2013; Pöyry et al. 2013).

In line with prior studies, we use perceived usefulness in this study to measure the cognitive state, while perceived enjoyment is used to measure the affective state (Koufaris 2002; van der Heijden 2003). With respect to trust, researchers argue that trust encompasses both cognitive and affective elements, which are intertwined, and which makes it difficult to differentiate between them (Chang and Chen 2008; Corritore et al. 2003; Riegelsberger et al. 2005). We therefore consider trust in this study to address both the cognitive and the affective state.

Perceived usefulness is a central concept in the Technology Acceptance Model (TAM) and is defined as “the degree to which a person believes that using a particular system enhances his or her job performance” (Davis 1989, p. 320). While this definition of perceived usefulness was developed in the context of workplace systems,

the concept has also been applied to the contexts of e-commerce and social commerce. In the e-commerce context, several studies showed that the perceived usefulness of an e-commerce website can significantly affect consumers' online behaviors, such as their website use, information search, or purchasing behavior (e.g., Chen et al. 2002; Gefen et al. 2003; Järveläinen 2004; Pavlou 2003; van der Heijden 2003).

Similar findings have also been found in the social commerce context (e.g., Featherman and Hajli 2015; Hajli 2014; Kim 2015; Noh et al. 2013; Shin 2013). Note that the TAM also suggests perceived ease of use as a potential determinant of the use of information systems. Other than perceived usefulness, which measures the effectiveness of an information system, perceived ease of use characterizes its efficiency (Davis 1989). Since we want to study how e-commerce websites can be made more effective, we decided to limit the scope of our examination to perceived usefulness.

Generally, enjoyment is an intrinsic motivator that stimulates people to do something (Deci and Ryan 1985; Ryan and Deci 2000). In the literature on technology adoption, perceived enjoyment is defined as "the extent to which the activity of using a particular system is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated" (Davis et al. 1992, p. 1113). Like perceived usefulness, perceived enjoyment can have significant effects on individuals' system usage (Davis et al. 1992; van der Heijden 2004). Perceived enjoyment is also a critical factor in the e-commerce context. Significant positive effects of perceived enjoyment on consumers online behaviors, such as their website usage or purchasing behavior, have been found (e.g., Cyr et al. 2007; Koufaris 2002; Parboteeah et al. 2009; van der Heijden 2003). Similar effects have been reported in the social commerce literature (Sharma and Crossler 2014; Shen 2012; Shin 2013).

According to Mayer et al. (1995), trust can be defined as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (Mayer et al. 1995, p. 712). Trust is an important determinant in the success of e-commerce websites given that consumers and website vendors are spatially and temporally separated and that products can only be experienced virtually (Brynjolfsson and Smith 2000; Pavlou 2003). Consequently, several e-commerce studies could show that trust can significantly increase consumers' online purchasing behavior (e.g., Gefen et al. 2003; McKnight et al. 2002b; Pavlou 2003). Positive effects of trust on consumers' purchasing and/or information sharing behavior have also been found in the social commerce domain (Chen and Shen 2015; Hajli 2015; Hsiao et al. 2010; Lu et al. 2016; Shi and Chow 2015). In this study, we adopt the online trust definition of McKnight et al. (2002a), which focuses on a consumer's initial trust in an

e-commerce website. Initial trust refers to "the period during which a consumer visits and explores a vendor's website for the first time" (McKnight et al. 2002a, p. 336).

Studies in which online trust is the primary factor of interest oftentimes decompose trust into different trusting beliefs, such as competence, benevolence, and integrity, to better understand the different facets of trust (Brengman and Karimov 2012; Chow and Shi 2014; Lee and Turban 2001; McKnight et al. 2002a). Alternatively, if the research goal is to understand a more comprehensive user reaction to a website, trust is usually conceptualized as a single construct (Hassanein and Head 2007; Kim et al. 2008; Pavlou 2003; Suh and Han 2003; van der Heijden et al. 2003). Since the objective of this study is to investigate how social commerce feature richness affects the website stickiness through cognitive and affective factors, we take the latter approach and conceptualize trust as a single construct.

2.4. Website stickiness as response (R)

Website stickiness is a critical factor for e-commerce websites to create business value (Zott et al. 2000). The more attention an e-commerce website receives from consumers, the higher is the likelihood that the website generates sales transactions (Lin et al. 2010). In the e-commerce literature, website stickiness has broadly been conceptualized and measured from two different perspectives. On the one hand, website stickiness is conceptualized as the consumers' intention to consistently reuse a website in the future (Li et al. 2006). Studies adopting this conceptualization mostly use different questionnaire items to measure website stickiness, such as asking consumers whether they intend to continue using the website or how likely it is that they will return to the website (Benlian 2015; Li et al. 2006; Lin 2007). While this conceptualization has its uses, it is not without criticism as researchers point out that aspects such as the continued use and reuse of a website are also addressed by the concept of continuance (Bhattacherjee 2001; Li et al. 2006; Tangmanee 2017).

Hence, the label continuance intention could be used in such settings. On the other hand, website stickiness is conceptualized as the consumers' amount of time spent and interaction while using a website (Olbrich and Holsing 2011; Tangmanee 2017). Instead of focusing on consumers' intention to reuse a website, this conceptualization directly addresses consumers' actual website usage behavior. Therefore, studies adopting this conceptualization commonly measure website stickiness through different website metrics, such as the number of clicks, number of page views, and visit duration per consumer (Bansal et al. 2004; Bhat et al. 2002; Lin et al. 2010; Tangmanee 2017). In this study, we decided to focus on analyzing the actual website usage, which we deem to be a necessary precondition for future website reuse. Accordingly, we adopted the latter conceptualization and measurements. By clearly separating the concept of website stickiness from the concept of continuance, we were also

able to restrict ourselves to reflecting consumers' behavioral responses (in contrast to intentions) as suggested by the S-O-R model (Mehrabian and Russell 1974).

3. Research model and hypotheses development

Building on the before-mentioned theoretical background, we propose a research model that allows us to investigate how social commerce feature richness influences the website stickiness through cognitive and affective factors. Figure 1 depicts the overall structure of our research model.

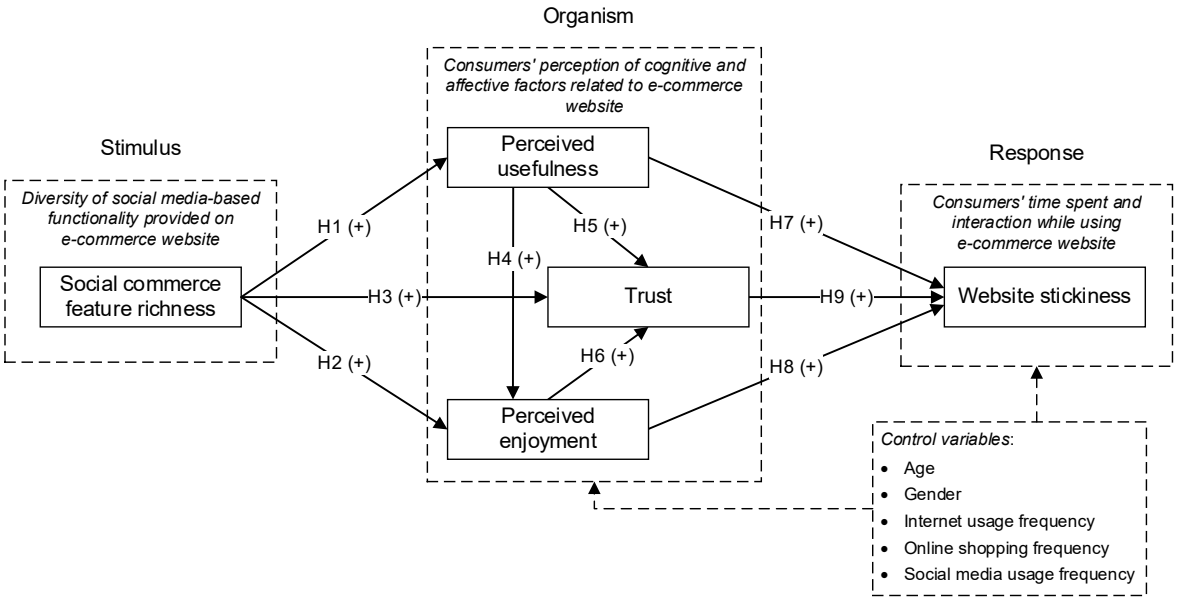


Figure 1 Research model

3.1. Effects of social commerce feature richness on cognitive and affective factors

In the e-commerce context, Parboteeah et al. (2009) showed that task-relevant as well as mood-relevant website cues can significantly increase the perceived usefulness. Task-relevant website cues are more utilitarian-oriented and directly facilitate consumers' shopping tasks (e.g., product descriptions, navigation aids, shopping cart). Mood-relevant website cues are more hedonic-oriented and are used to create an appealing mood/atmosphere at a website (e.g., human pictures, music, colors). The positive effect of mood relevant website cues on perceived usefulness is because individuals associate an appealing website with a higher usability (Tractinsky et al. 2000; van der Heijden 2003). We argue that social commerce features can address both task-relevant and mood-relevant aspects (Grange and Benbasat 2010). Rating and review tools, for instance, are more task-oriented since they support consumers' shopping tasks by providing additional product-related information. Community feeds, in turn, are more mood-oriented since they create an appealing atmosphere on a website by showing what other consumers

have recently bought. Consequently, by combining functionally diverse social commerce features, task-relevant and mood-relevant aspects can be addressed.

Considering how online consumers process information and make purchase decisions can further help to understand the effects of social commerce feature richness on perceived usefulness. According to the human information processing theory, consumers' decision-making on e-commerce websites can broadly be divided into two stages (Kumar and Benbasat 2006; Payne et al. 1992). In the first stage, the available products are briefly screened and reduced until a manageable set of alternatives remains. In the second stage, the products in the reduced set are evaluated in detail. The social information generated by social commerce features can support consumers in both stages. Social product recommendation tools, for instance, can help consumers in the first stage to identify potential product candidates more quickly by showing what other consumers with similar shopping interests bought (Kumar and Benbasat 2006).

By providing information about other consumers' opinions, rating and review tools, in turn, can assist consumers to evaluate the reduced set of products in more detail in the second stage (Kumar and Benbasat 2006). Thus, by combining functionally diverse social commerce features to provide different kinds of social information, both stages of the decision-making process can be supported. Building on the rational that functionally richer sets of social commerce features can address task-relevant as well as mood-relevant aspects of the website and can support consumers in different stages of the purchase decision-making process, we hypothesize that:

Hypothesis 1 *(The Feature Richness-Usefulness Hypothesis). Social commerce feature richness has a positive effect on perceived usefulness.*

As shown by Parboteeah et al. (2009), task-relevant and mood-relevant website cues can also significantly increase the perceived enjoyment. By combining functionally diverse social commerce features that address task-relevant and mood-relevant aspects, higher levels of perceived enjoyment may thus be generated. Social presence theory can be used to explain the effect of social commerce feature richness on perceived enjoyment. Generally, social presence refers to "the degree to which the medium permits users to experience others as being psychologically present" (Fulk et al. 1987, p. 531). The more human warmth and sociability a medium conveys, the greater the social presence (Fulk et al. 1987; Short et al. 1976). Studies in the e-commerce literature found that websites incorporating socially rich design elements (e.g., human images, human videos, personalized greetings) can significantly increase the perceived enjoyment, since consumers associate websites that convey a sense of human warmth and sociability with more pleasure (Cyr et al. 2007; Hassanein and Head 2005; Wakefield et al. 2010).

Social commerce features provide various means to incorporate socially rich design elements into e-commerce websites (Curty and Zhang 2013). Examples are consumers' profile pictures displayed on social profile pages, opinions about products provided through rating and review tools, lists of favorite products created and shared through social wish lists, or recent shopping activities of other consumers visualized in community feeds (Curty and Zhang 2013; Huang and Benyoucef 2015). Consequently, it can be argued that if an e-commerce website incorporates a greater diversity of functionally diverse social commerce features to convey different kinds of social information, a greater sense of human warmth and sociability can be conveyed. For instance, by combining rating and review tools with social wish lists, consumers can not only perceive the presence of other consumers from their product opinions but also from their lists of favorite products. The more consumers can experience and interact with other consumers, including friends and family members, the more likely it is that they enjoy their shopping experience (Kim 2015; Zhang et al. 2014). Considering the above arguments, it seems reasonable that websites providing a higher level of social commerce feature richness will be associated with a higher level of perceived enjoyment. Hence, we hypothesize that:

Hypothesis 2 *(The Feature Richness-Enjoyment Hypothesis). Social commerce feature richness has a positive effect on perceived enjoyment.*

The effects of social commerce feature richness on trust can be explained through signaling theory (Spence 1973). Applied in the e-commerce context, signaling theory suggests that when it is difficult for consumers to assess the quality of a product or the trustworthiness of a website, they attend to specific kinds of informational cues as signals (Boulding and Kirmani 1993; Helm and Mark 2007; Kirmani and Rao 2000). In particular, they look for signals that are difficult to manipulate. The social information that is generated by social commerce features can provide such signals (Karimov et al. 2011). For instance, product ratings and reviews generated through rating and review tools include other consumers' opinions about their personal product experiences (Chen and Xie 2008). Consumers consider such opinions as a trustworthy source of information (Benlian et al. 2012). Providing product ratings and reviews on an e-commerce website can thus signal consumers that the vendor behind the website acts in their best interest, which can increase consumers' trust in the website (Pavlou and Dimoka 2006). Signaling that the vendor acts in the consumers' best interests is reflected by the trusting belief "benevolence", which is considered as a form of affective trust (McAllister 1995; Riegelsberger et al. 2003).

Yet, social commerce features may also affect the cognitive dimension of trust, which relates to the trusting beliefs "competence" and "integrity" (McAllister 1995; Pavlou and Dimoka 2006; Riegelsberger et al. 2003). For

instance, through rating and review tools, a website vendor can respond to negative product reviews and, accordingly, signal competence and integrity (Sparks et al. 2016). Similarly, a website vendor may signal competence and integrity by answering consumers' questions which are generated through question and answer tools. Following on from these examples, we argue that by combining functionally diverse social commerce features, cognitive as well as affective dimensions of trust can be addressed. Cue consistency theory can be used as an additional theoretical lens to explain the potential effects of social commerce feature richness on trust. Cue consistency theory suggests that individuals more likely rely on a set of cues if the information provided by these cues is consistent (Maheswaran and Chaiken 1991).

Using functionally diverse social commerce features in combination may thus have a cumulative effect on consumers' trust in the website (Brengman and Karimov 2012). For instance, displaying consumers' recent activities together with their social wish lists may corroborate the message that the website is also used by other consumers and thus may be trustworthy. Considering that functionally richer sets of social commerce features can affect both cognitive and affective dimensions of trust and that these effects may accumulate, it can be assumed that a higher level of social commerce feature richness will also be associated with a higher level of trust. We thus propose:

Hypothesis 3 *(The Feature Richness-Trust Hypothesis). Social commerce feature richness has a positive effect on trust.*

3.2. Effects between cognitive and affective factors

In the e-commerce domain, Parboteeah et al. (2009) as well as Al-Maghrabi and Dennis (2011) provide initial evidence that perceived usefulness can positively influence perceived enjoyment. Literature focusing on the interplay between cognition and affect in consumers' decision-making can be used to explain this effect (Shiv and Fedorikhin 1999). According to Berkowitz (1993), the exposure to a stimulus is usually first accompanied by cognitive processes, which can then trigger affective reactions. Cognitive reactions can thus lead to affective reactions (Holbrook and Batra 1987). For instance, by incorporating a functionally rich set of social commerce features, an e-commerce website may become more useful to consumers (i.e., cognitive reaction).

The higher the website's usefulness, the more likely it is that consumers can accomplish their shopping task, which can translate into greater levels of enjoyment (i.e., affective reaction) (Arnold and Reynolds 2003). Consequently, it can be argued that if consumers associate an e-commerce website with a higher usefulness, higher levels of enjoyment can be generated. Thus, we hypothesize:

Hypothesis 4 *(The Usefulness-Enjoyment Hypothesis). Perceived usefulness has a positive effect on perceived enjoyment.*

While the connection between perceived usefulness and trust has widely been investigated in the e-commerce literature, different opinions exist whether perceived usefulness influences trust or trust influences perceived usefulness (Beatty et al. 2011). In this context, studies focusing on initial online trust argue that since consumers have no prior experience with the vendor, the website gives a first impression of the vendor's capabilities (Chang and Chen 2008; Hampton-Sosa and Koufaris 2005; Koufaris and Hampton-Sosa 2004; McKnight et al. 2002b). Therefore, if consumers perceive that the website is useful, it is likely that they have higher trusting beliefs about the vendor's benevolence, competence, and integrity, and thus find the website more trustworthy (Hampton-Sosa and Koufaris 2005; McKnight et al. 2002b).

In contrast, studies focusing on scenarios in which consumers are already familiar with the vendor argue that since consumers may already trust the vendor and its website, higher levels of perceived usefulness may be generated (Gefen et al. 2003; Pavlou 2003). Since this study concentrates on initial trust (c.f. section 2), perceived usefulness is treated as an antecedent of trust. In line with studies focusing on initial trust (Chang and Chen 2008; Hampton-Sosa and Koufaris 2005), we assume that the perceived usefulness of a website can signal consumers that the vendor behind the website is competent and acts in their interest, which can result into higher levels of trust in the website. Therefore, we hypothesize:

Hypothesis 5 *(The Usefulness-Trust Hypothesis). Perceived usefulness has a positive effect on trust.*

Perceived enjoyment can also play a significant role in the formation of trust. For instance, Hampton-Sosa and Koufaris (2005) investigated how perceived usefulness and perceived enjoyment together influence the appeal of a website and how this appeal affects trust. According to their results, perceived enjoyment is positively related to consumers' trust trough website appeal (Hampton-Sosa and Koufaris 2005). In addition, Hwang and Kim (2007) investigated how the quality of an e-commerce website affects consumers' enjoyment and anxiety and how these factors together influence consumers' trusting beliefs in the website. Significant positive effects of perceived enjoyment on the trusting beliefs integrity and ability could be found (Hwang and Kim 2007). Flow theory can be used as a theoretical lens to understand these effects (Csikszentmihalyi 1975; Csikszentmihalyi and Csikszentmihalyi 1988). According to Csikszentmihalyi (1975, p. 43), flow denotes "the holistic sensation that people feel when they act with total involvement". It is described as the feeling after one says: "that was fun," or "that was enjoyable" (Csikszentmihalyi 1975, p. 43).

Thus, flow is conceptually related to enjoyment. When people are in flow, they use more mental resources to focus on the activity and more efficiently filter out irrelevant thoughts. Flow is also accompanied by a feeling of having control over one's actions and the environment (Csikszentmihalyi 1975). In the e-commerce context, studies could show that being in control can reduce consumers' uncertainty and risk perceptions, which in turn can increase consumers' trust in the website (Chang and Chen 2008; Dinev and Hart 2006). It can thus be reasoned that if consumers are in a state of flow and associate a website with a higher level of enjoyment, it is likely that they will also perceive the website as more trustworthy. Therefore, we hypothesize:

Hypothesis 6 *(The Enjoyment-Trust Hypothesis). Perceived enjoyment has a positive effect on trust.*

3.3. Effects of cognitive and affective factors on website stickiness

With respect to the effect of perceived usefulness on website stickiness, Bansal et al. (2004) could show that certain website characteristics (e.g., information available, product selection), which are related to perceived usefulness, can positively affect consumers' overall website satisfaction, which in turn positively affects website stickiness. Furthermore, Polites et al. (2012) found that perceived usefulness can also directly influence website stickiness, besides its indirect influence through satisfaction. In addition, Lin (2007) provides evidence that the perceived value of a website, which is conceptually related to perceived usefulness, did positively affect consumers' intention to stick to a website. In line with the initial evidence provided in the e-commerce literature (Bansal et al. 2004; Lin 2007; Polites et al. 2012), it can be argued that the more consumers perceive that an e-commerce website is useful and supports them in their decision-making, the higher the likelihood that consumers will stick to the website. Hence, we propose:

Hypothesis 7 *(The Usefulness-Website Stickiness Hypothesis). Perceived usefulness has a positive effect on website stickiness.*

While several e-commerce studies have investigated how perceived enjoyment affects consumers' satisfaction, loyalty, or purchase intention (cf. section 2), the relationship between perceived enjoyment and website stickiness has only received little attention so far. With respect to social networking websites, Yang and Lin (2014) could show that the higher the perceived hedonic value (e.g., enjoyment) is, the higher is the individual's intention to stick to the website. In the e-commerce context, Benlian (2015) could show that different website personalization cues can positively affect the perceived enjoyment, which in turn can influence the stickiness intention. Following Benlian (2015), it can be argued that with greater levels of enjoyment, a website may become more comfortable to its users and thus may increase the likelihood that users will stay longer on the website. Therefore, we propose:

Hypothesis 8 *(The Enjoyment-Website Stickiness Hypothesis). Perceived enjoyment has a positive effect on website stickiness.*

Initial evidence has also been reported that trust can significantly increase the website stickiness. In the e-commerce context, Li et al. (2006) as well as Polites et al. (2012) found a significant positive relationship between trust and website stickiness. However, Xu and Liu (2010) also found a non-significant effect of trust on website stickiness, which leaves space for further investigations. In line with Li et al. (2006) as well as Polites et al. (2012), we follow the argumentation that if consumers do perceive a website as trustworthy, it is likely that they will be more attracted to the website and thus will more likely stick to the website. Conversely, if consumers do not trust a website, it becomes more likely that they will interact less and spend less time on the website. We thus propose:

Hypothesis 9 *(The Trust-Website Stickiness Hypothesis). Trust has a positive effect on website stickiness.*

3.4. Control variables

The research model includes five control variables that we specified to account for possible confounding effects, which may arise from consumers' individual characteristics and may affect the cognitive/affective factors as well as the website stickiness. Following advice from literature, we considered age, gender, internet usage frequency, online shopping frequency, and social media usage frequency as control variables (Chiu et al. 2014; Huang and Benyoucef 2017; Li et al. 2006; Stewart 2003; Wei et al. 2014).

4. Research methodology

4.1. Experimental setting

We evaluated our research model in a controlled online experiment. A controlled experimental setting was used as it enabled us to manipulate social commerce feature richness on an e-commerce website in a systematic manner, which is otherwise difficult to achieve in natural e-commerce environments. Moreover, it allowed us to control the exogenous variables as much as possible to obtain measurements that are more accurate.

The design of our experiment followed the concept of related experiment-based studies, which explored the effects of various website features on the users' attitude towards the website (Brengman and Karimov 2012; Cyr et al. 2009; Hassanein and Head 2007). The experiment used a 1 x 4 between-subjects design, manipulating four incremental levels of social commerce feature richness with four independent groups.

For the experiment, we designed an e-commerce website that consisted of four versions, which were used by disjoint groups of participants. The versions differed from each other only with respect to the functional richness of the integrated social commerce features. To select the social commerce features, we took the reference model

for the design of social commerce platforms developed by Huang and Benyoucef (2013) into account (cf. section 2). Following the recommendations of Huang and Benyoucef (2013), we selected features that address different layers of the reference model. In so doing, we were able to increase social commerce feature richness in a systematic manner. The first version of the website did not include any social commerce features and thus represented a "zero level" (i.e., control group). We used this "zero level" to verify that the absence of social commerce features on an e-commerce website indeed leads to the lowest effects on the website stickiness.

The second version of the website provided a rating and review tool together with social profile pages. Rating and review tools are widespread in practice and supposed to work effectively (Amblee and Bui 2011; Huang and Benyoucef 2015). In general, rating and review tools enable consumers to create conversations about products and to share their product experiences and knowledge. According to Huang and Benyoucef (2013), such a functionality addresses the "conversation" layer of the reference model. Social profile pages were additionally used to display consumers' profile information together with the reviews. According to Huang and Benyoucef (2013), enabling consumers to create social profiles targets the "individual" layer and thus represents a basic functionality for all other layers. As the individual layer serves as a facilitator to realize the other layers (cf. section 2), we did not represent it as a separate treatment group. Nevertheless, our setting closely followed the recommendations of Huang and Benyoucef (2013) that any e-commerce website that plans to integrate social commerce features should start by addressing the individual and the conversation layer.

To increase social commerce feature richness, the third version of the website provided social wish lists next to the rating and review tool and the social profile pages. Following Huang and Benyoucef (2013), social wish lists address the "commerce" layer since they link consumers with similar shopping interests and allow consumers to share these lists with potential customers. Consequently, our website covered three of the four suggested layers of the reference model (i.e., "individual", "conversation", and "commerce" layer). Moreover, it followed the recommendation that e-commerce websites planning to integrate social commerce features should pay attention to the commerce layer after addressing the conversation and individual layer (Huang and Benyoucef 2013).

To further increase social commerce feature richness, the fourth version of the website provided a community feed next to social wish lists, a rating and review tool, and social profile pages. The community feed that we used enabled consumers to post status messages and to view and comment on the recent activities of other consumers. With such a functionality, the community feed supports the creation of relationships, which addresses the "community" layer of the reference model (Huang and Benyoucef 2013). According to Huang and Benyoucef

(2013), such as setting should be more effective than the previous settings as it covers all of the four layers of the reference model with functionally diverse social commerce features.

Table 1 illustrates the different website versions and the manipulated levels of social commerce feature richness used in the experiment. Screenshots of the different website versions and the integrated social commerce features are provided in Appendix A. Note that the website has been created in German language as the study was conducted with participants from Germany, which we wanted to address in their mother tongue.

Table 1 Manipulation levels of social commerce feature richness used in the experiment

Website version	Feature richness level	Available social commerce features	Layers in reference model (Huang and Benyoucef 2013)
1	None	-	-
2	Low	Social profile pages (basic functionality)	Individual
		Rating and review tool	Conversation
3	Medium	Social profile pages (basic functionality)	Individual
		Rating and review tool	Conversation
		Social wish lists	Commerce
4	High	Social profile pages (basic functionality)	Individual
		Rating and review tool	Conversation
		Social wish lists	Commerce
		Community feed	Community

To ensure that the experiment reproduces a realistic scenario, we created our e-commerce website using a professional web-based platform, which supports the rapid creation of online shops and their extension with additional features by using an app store. We were hence able to set up a complete e-commerce website and configure it with the selected social commerce features as needed. To ensure that the participants are confronted with a shopping domain, in which they can act profoundly, but may nevertheless appreciate additional information about the offered goods, we created an online shop of a fictitious company that sells unbranded gift gadgets. Unbranded gift gadgets seemed to be an appropriate choice for several reasons (Brengman and Karimov 2012; Lowry et al. 2008). First, their selection is at least partially based on social and emotional aspects, which makes them attractive for social commerce scenarios. Second, gift gadgets are associated with manageable financial risk. Third, potential branding effects are avoided. We hence filled the website with several popular gift gadgets that we took over from real websites after acquiring permission. In addition, we generated all the information necessary to populate the various social commerce features with content.

4.2. Task and procedure

To simulate a realistic e-commerce scenario, we followed related experiment-based studies and used a task that involved browsing an e-commerce website, selecting, and buying a product (Brengman and Karimov 2012;

Cyr et al. 2009; Hassanein and Head 2007). The experiment was entirely conducted online. To start the experiment, we asked the participants to open a webpage, which provided access to the e-commerce website and to the online survey. At the beginning, the participants were directed to a landing page, on which the task of the experiment was explained. Subsequently, relevant demographic information was inquired. Afterwards, the system automatically and randomly assigned the participants to one of the four groups and gave them access to one of the four above-mentioned variants of the e-commerce website. Equipped with an identical amount of virtual money, the participants were asked to select and buy a gift of their choice for a good friend's upcoming birthday party. The task description was adapted from Brengman and Karimov (2012). Each group had access to exactly one of the four website versions. The shopping task had no time limit to enable participants to browse the website as long as needed.

All website features including the social commerce features were fully functional so that the participants could interact with them as much as needed. Note that the shopping task could also be completed without using some or even any social commerce features. With the described design, we ensured that the shopping task was as realistic as possible and identical across the groups. The social commerce features were also not mentioned in the task to avoid any potential bias that may result from the participants' awareness of the experimental treatment. After completing the shopping task on the e-commerce website, the participants were redirected to an online survey, in which we asked for their perception of the cognitive and affective factors contained in our research model.

4.3. Measures

Social commerce feature richness was measured using a four-level categorical variable to capture the four manipulation levels (i.e., zero, low, medium, high) used in our experimental setting. Starting from the "zero level", each subsequent level represented a functionally richer set of social commerce features according to the functional layers of the reference model of Huang and Benyoucef (2013). By selecting features that address different layers, the reference model thus helped us to make sure that social commerce feature richness was increased in a systematic manner. To ensure that the variable can be appropriately included in the subsequent statistical analysis, we followed the recommendations of Henseler et al. (2016) and converted the variable into a formative construct that consisted of three binary dummy variables. The three binary dummy variables were used to categorically capture the four different levels of social commerce feature richness. Using dummy variables to represent different treatment conditions is also consistent with prior experiment-based studies (Chen et al. 2009; Cyr et al. 2009; Kamis et al. 2008).

To verify the manipulation of the independent variable, we followed guidelines to ask the participants if they experienced the manipulation (Straub et al. 2004). We asked a question in the form: "Did you notice <social commerce feature> in this online shop?" for each social commerce feature that played a role in our experiment (Brengman and Karimov 2012). The answers were measured on three-point scales consisting of "yes – no – unsure".

To measure the cognitive and affective factors, we used validated scales that we took over from literature with minor wording changes to adapt them to the context of our study. All questionnaire items were operationalized using seven-point Likert scales. Table 2 provides a list of the items.

Table 2 Measurement items used in the online survey

Construct	Item	Sources
Perceived usefulness (PU)	PU1: This online shop enables me to search and buy gifts faster. PU2: This online shop makes it easier for me to search and buy gifts. PU3: This online shop improves my performance in gift searching and buying. PU4: I find this online shop useful for searching and buying gifts.	Gefen et al. (2003), Kumar and Benbasat (2006)
Perceived enjoyment (PE)	PE1: I found my visit to this online shop fun. PE2: I found my visit to this online shop exciting. PE3: I found my visit to this online shop entertaining. PE4: I found my visit to this online shop boring. (reverse coded)	Koufaris (2002), Hassanein and Head (2005)
Trust (TR)	TR1: I would trust this online shop. TR2: I find this online shop trustworthy. TR3: I believe that this online shop keeps its promises and commitments. TR4: I think that this online shop knows how to provide excellent service. TR5: I believe that this online shop keeps my best interests in mind.	Pavlou (2003), Suh and Han (2003)
Manipulation check items	1. Did you notice other consumers' profiles in this online shop? 2. Did you notice product rating and reviews in this online shop? 3. Did you notice social wish lists in this online shop? 4. Did you notice a community feed in this online shop?	Brengman and Karimov (2012)

Website stickiness was measured by investigating the participants' actual website usage behavior. As described in section 2, various website metrics can be used to measure website stickiness. In this study, we adapted the approach of Tangmanee (2017) and measured website stickiness through the following three website metrics: number of clicks per user, number of pages viewed per user, and time spent per user. As prior studies could show, all three metrics are significantly related and thus can be used to measure website stickiness (Mallapragada et al. 2016; Olbrich and Holsing 2011; Tangmanee 2017). Table 3 provides a description of the employed website metrics.

Table 3 Website stickiness metrics used in the experiment

Website stickiness metric	Description
Number of clicks per user (NCU)	The total number of clicks a user made while using the e-commerce website.
Number of pages viewed per user (NPU)	The total number of pages a user viewed while using the e-commerce website.
Time spent per user (TSU)	The total amount of time (in seconds) a user spent while using the e-commerce website.

Clickstream data was used to collect these metrics. In general, a clickstream is a record of a user's actions on a given website such as the sequence of pages visited by the user (Bucklin and Sismeiro 2009). To gather the clickstream data, a self-developed JavaScript session tracking tool was integrated into the e-commerce website. The tool recorded the number of clicks, the pages viewed, and the viewing duration of the pages for each user session. The tool worked in the background and was not noticeable for the user. The recorded user session data was stored in a separate database, which we set up for the experiment. URL parameters were used to link the recorded user session data of the e-commerce website to the online survey data. In so doing, we were able to investigate how the participants' perception of the cognitive and affective factors is related to the website stickiness metrics. Note that according to our experimental task, each participant could visit the e-commerce website exactly one time to keep the setting identical across the participants. Repeated visits were thus explicitly excluded. The recorded user session data consisted of single visits, which is in line with prior studies (Olbrich and Holsing 2011; Tangmanee 2017).

With respect to the control variables (i.e., consumers' individual characteristics), the items for age and gender were taken from Li et al. (2006), the items for internet usage frequency and online shopping frequency were taken from Huang and Benyoucef (2017), and the items for social media usage frequency were taken from Wei et al. (2014).

4.4. Pilot test

A pilot test was conducted to verify that the experimental setting worked as intended. For the pilot test, we invited five student participants to test the e-commerce website and the online survey. Following the experimental task, the participants had to carefully browse, select, and buy a product from each of the four versions of the e-commerce website. Afterwards, we asked the participants to provide feedback on the different versions of the e-commerce website and on the online survey. Questions and problems concerning the e-commerce website and the online survey were recorded, and appropriate changes were made. Furthermore, the participants independently

reported that each version of the website provided a different functional richness of social commerce features, which suggested that the versions were manipulated sufficiently and appropriately.

4.5. Participants

We decided to invite students of a large university in Germany as participants for the experiment. Although using students as substitutes for everyday users is not without critics, we deliberately chose to focus on this target group, as it is likely that student participants are highly familiar with online shopping and willing to try out new approaches (McKnight et al. 2002a; Wells et al. 2011). Moreover, using students as substitutes allowed us to conduct the experiment in a controlled setting and consequently to limit the number of confounding variables. We invited students that participated in current lecture courses. We issued a call for participation using the online learning platform of the university and invited them personally during our lecture courses. Apart from a personal motivation, no incentive was given as we wanted to recruit intrinsically motivated individuals.

5. Data analysis and results

Overall, we collected data from 212 participants. After sorting out incomplete responses, we retained 180 usable responses for data analyses. Following the recommendations of Straub et al. (2004), we decided to only include those responses in our final data set, in which the participants did not wrongly assess the social commerce features employed in the online shop. The procedure was applied to all four groups used in our experimental setting. As for example in group 1, to which no social commerce features were provided, we eliminated the responses where participants stated that they perceived any social commerce feature. In group 2, to which social profile pages and a rating and review tool were provided, we eliminated the responses where the participants did not realize the provided features or wrongly recognized not included features (e.g., social wish lists, community feed). Responses in group 3 and group 4 were treated in a similar manner. Doing so allowed us to not only ensure that the participants' engagement was credible but also that their assessment of the online shop was valid. This procedure left us with a total of 164 responses.

Of them, 75 (45.7%) were female and 89 (54.3%) were male. All participants were undergraduate or graduate students from business administration, information systems, and computer science degree programs. On average, they were 24 years old. Table 4 depicts the demographic statistics of the participants.

Table 4 Participant demographic statistics (n = 164)

Demographics	Category	Numbers	Percentage	Sources
Gender	Female	75	45.7%	Li et al. (2006)
	Male	89	54.3%	
Age	Younger than 20 years old	7	4.3%	Li et al. (2006)
	20 - 29 years old	146	89.0%	
	30 - 39 years old	10	6.1%	
	Older than 39 years old	1	0.6%	
Internet usage frequency	Less than one hour per day	4	2.4%	Huang and Benyoucef (2017)
	1 - 2 hours per day	22	13.4%	
	2 - 3 hours per day	40	24.4%	
	3 - 6 hours per day	54	32.9%	
	6 - 10 hours per day	37	22.6%	
	More than 10 hours per day	7	4.3%	
Online shopping frequency	Never	1	0.6%	Huang and Benyoucef (2017)
	Less than once per month	37	22.6%	
	1 - 2 times per month	64	39.0%	
	3 - 5 times per month	42	25.6%	
	6 - 10 times per month	17	10.4%	
	More than 10 times per month	3	1.8%	
Social media usage frequency	Do not use social media	8	4.9%	Wei et al. (2014)
	Less than one hour per day	55	33.5%	
	1 - 2 hours per day	59	36.0%	
	2 - 3 hours per day	30	18.3%	
	3 - 5 hours per day	10	6.1%	
	More than 5 hours per day	2	1.2%	

To verify that the participants were equally distributed over the four treatment groups, we conducted *a one-way analysis of variance* (ANOVA) for each of the demographic statistics. Group sizes ranged from 39 to 43 participants. There were no significant differences in age ($F = 0.502$, $p>0.1$), gender ($F = 0.783$, $p>0.1$), internet usage frequency ($F = 0.666$, $p>0.1$), online shopping frequency ($F = 0.690$, $p>0.1$), and social media usage frequency ($F = 1.310$, $p>0.1$) among the four groups.

We then analyzed our theoretical model using *partial least squares* (PLS) with SmartPLS 3 (Ringle et al. 2015). PLS structural equation modeling (PLS-SEM) is appropriate to test our model because the model is comparably complex and includes various control variables. In particular, PLS is often referred to have the advantage that it not only maximizes the explained variance of the endogenous variables, but that it also is more stable to non-normal distributed data than other (co-)variance based approaches (Chin 1998). With 164 participants, we deem the sample size to be sufficient for a robust PLS calculation considering the number of variables and paths in our model (Chin 1998; Hair et al. 2012). Note that in the PLS analysis, social commerce feature richness was modelled as a formative construct that consisted of three binary dummy variables to categorically capture the four different levels of social commerce feature richness, as suggested by Henseler et al. (2016). All other variables were modelled as reflective constructs.

5.1. Measurement validation

We performed various tests to check the validity and reliability of our measurement model. In line with Hair et al. (1995), we used standardized data for the tests since we measured the cognitive/affective factors and the website stickiness on different scales. First, we checked for common method bias (Podsakoff et al. 2003). By employing different techniques to measure the cognitive/affective perceptions (i.e., survey data) and the website stickiness (i.e., clickstream data), the chance of common method was reduced in our study. Nevertheless, we tested for common method bias by conducting a Harman's one-factor test as suggested by Podsakoff et al. (2003). The results showed that multiple factors are present, and that the most covariance explained by one factor is 45.59%. This indicates that a common method bias is not likely a serious concern to our study.

To validate the reflective measures, we determined the construct reliability, the convergent validity, and the discriminant validity. Referring to the construct reliability, composite reliability and Cronbach's alpha should be higher than 0.7 (Nunnally 1978; Werts et al. 1974). With respect to the convergent validity, standardized item loadings should be higher than 0.7 (Gefen et al. 2000) and the average variance extracted (AVE) from a construct should be higher than 0.5 (Fornell and Larcker 1981). Table 5 summarizes the results of our measurement validation. As shown, the composite reliability is consistently higher than 0.9 and the Cronbach's alpha is consistently higher than 0.8. Moreover, the item loadings are consistently higher than 0.7 and the AVE is consistently higher than 0.6.

Table 5 Descriptive, reliability, and validity statistics

Construct	Item	Mean	Std. dev.	Item loading	CR	Cronbach's alpha	AVE
Perceived usefulness (PU)	PU1	5.358	1.340	0.891	0.921	0.886	0.746
	PU2	5.391	1.384	0.888			
	PU3	4.451	1.709	0.778			
	PU4	5.337	1.450	0.893			
Perceived enjoyment (PE)	PE1	4.920	1.405	0.880	0.907	0.864	0.710
	PE2	4.092	1.632	0.835			
	PE3	4.356	1.594	0.848			
	PE4	4.691	1.635	0.804			
Trust (TR)	TR1	5.616	1.174	0.846	0.917	0.887	0.689
	TR2	5.503	1.254	0.858			
	TR3	5.509	1.130	0.886			
	TR4	4.898	1.307	0.718			
	TR5	5.274	1.381	0.834			
Website stickiness (WS)	NCU	10.123	5.480	0.902	0.927	0.882	0.809
	NPU	6.012	3.510	0.915			
	TSU	114.779	66.222	0.881			

Note: (1) Descriptive statistics refer to the raw data, while the reliability and validity statistics were calculated on standardized data. (2) Social commerce feature richness is excluded since it is measured as a formative construct.

To demonstrate adequate discriminant validity, the square root of the AVE from a construct should be higher than 0.707 and should also be higher than the construct's correlations to the other constructs (Gefen et al. 2000). Table 6 shows that the square roots of all AVE values are higher than 0.707 and exceed the correlations to the other constructs. The cross-loadings of the items are presented in Appendix B.

Table 6 Construct correlations and square root of AVE (bold numbers)

Construct	PU	PE	TR	WS
Perceived usefulness (PU)	**0.864**			
Perceived enjoyment (PE)	0.622	**0.842**		
Trust (TR)	0.519	0.513	**0.830**	
Website stickiness (WS)	0.437	0.494	0.442	**0.900**

Note: Social commerce feature richness is excluded since it is measured as a formative construct.

The formative measure (i.e., social commerce feature richness) was validated by examining the weights and the variance inflation factor (VIF) values for the three formative items (i.e., the three binary dummy variables) (Cenfetelli and Bassellier 2009). The result showed that the weights were significant for all three items (0.557, $p<0.01$; 0.981, $p<0.001$; 1.132, $p<0.001$). Moreover, all VIF values were below the rule of thumb of 5 (1.545, 1.551, 1.532), indicating that multicollinearity is not a serious concern (Hair et al. 2011).

5.2. Hypotheses testing

Figure 2 shows the results of our PLS analysis. As recommended by Hair et al. (2011), we performed bootstrapping with 5.000 subsamples. Note that while we included all control variables in the PLS analysis, only the significant effects of the control variables are shown in Figure 2 to reduce the figure's complexity.

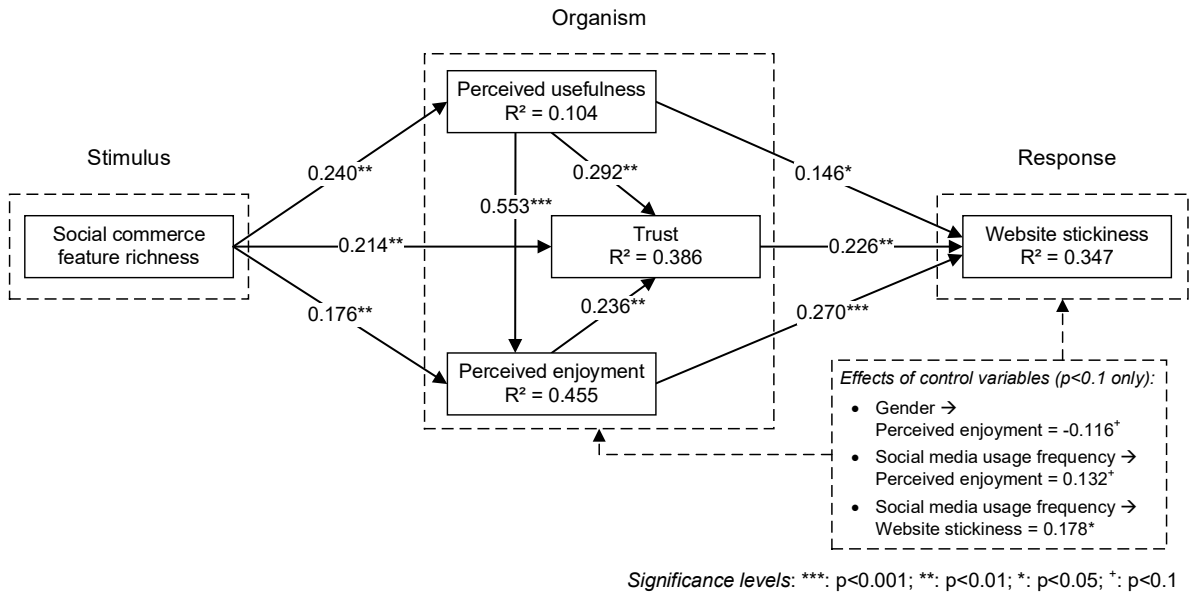


Figure 2 Results of PLS analysis

The results of our PLS analysis show that all path coefficients are statistically significant (see Table 7). Social commerce feature richness has a significant positive effect on perceived usefulness (0.240, $p<0.01$), perceived enjoyment (0.176, $p<0.01$), and trust (0.214, $p<0.01$). Accordingly, the results support hypotheses H1-H3. Moreover, perceived usefulness significantly influences perceived enjoyment (0.553, $p<0.001$) as well as trust (0.292, $p<0.01$), thus lending support for hypotheses H4-H5. Furthermore, perceived enjoyment has a significant positive effect on trust (0.236, $p<0.01$), which supports hypothesis H6. Finally, website stickiness is significantly positively influenced by perceived usefulness (0.146, $p<0.05$), perceived enjoyment (0.270, $p<0.001$), and trust (0.226, $p<0.01$), which supports hypotheses H7-H9.

With respect to the R^2 values, perceived usefulness, perceived enjoyment, trust, and the control variables explain 34.7% of the variance of website stickiness. Social commerce feature richness combined with perceived usefulness, perceived enjoyment, and the control variables explain 38.6% of the variance of trust, while social commerce feature richness together with perceived usefulness and the control variables explain 45.5% of the variance of perceived enjoyment. Furthermore, social commerce feature richness together with the control variables determines 10.4% of the variance of perceived usefulness. The results are in line with the recommendation of Falk and Miller (1992) that the R^2 value should be above 0.10.

With respect to the control variables, our results demonstrate that gender (in our study men) has a weak significant negative effect on perceived enjoyment (-0.116, $p<0.1$). Moreover, social media usage frequency has a weak significant positive effect on perceived enjoyment (0.132, $p<0.1$) and a significant positive effect on website

stickiness (0.178, $p<0.05$). All other relationships between the control variables and the constructs in our research model are above the $p<0.1$ level. The effects of all control variables are listed in Appendix C.

Table 7 Results of hypotheses testing

Hypothesis	Causal path	Path coefficient	t-value	p-value	Result
H1	SCFR → PU	0.240	2.850	0.004	Supported
H2	SCFR → PE	0.176	2.860	0.004	Supported
H3	SCFR → TR	0.214	2.942	0.003	Supported
H4	PU → PE	0.553	8.897	0.000	Supported
H5	PU → TR	0.292	3.097	0.002	Supported
H6	PE → TR	0.236	2.751	0.006	Supported
H7	PU → WS	0.146	2.205	0.027	Supported
H8	PE → WS	0.270	3.729	0.000	Supported
H9	TR → WS	0.226	2.850	0.004	Supported

SCFR: social commerce feature richness; PU: perceived usefulness; PE: perceived enjoyment; TR: trust; WS: website stickiness

5.3. Post-hoc analysis

We further analyzed and explored our data set by conducting a post-hoc analysis. First, we were interested in figuring out to what extent the relationship between social commerce feature richness and website stickiness is mediated by the cognitive and affective factors. For this purpose, we conducted a mediator analysis as suggested by Hair et al. (2014). Following the procedure of Hair et al. (2014), we first assessed the significance of the direct path between the independent variable (i.e., social commerce feature richness) and the dependent variable (i.e., website stickiness) without the mediator variables (i.e., cognitive/affective factors). The result showed a significant positive effect of social commerce feature richness on website stickiness (0.232, $p<0.01$). We then included the mediator variables (i.e., cognitive/affective factors) and assessed the significance of the indirect paths between the independent variable and dependent variable through the mediator variables.

All indirect paths were significant at the $p<0.05$ level. The direct path between social commerce feature richness and website stickiness was nonsignificant (0.040, $p>0.1$). All significant indirect paths were then added and divided by the total effect (i.e., indirect effect and direct effect) to determine the variance accounted for (VAF). The VAF determines how much the mediator variables absorb of the direct effect. The result showed a VAF of 82.31%, indicating that the relationship between social commerce feature richness and website stickiness is fully mediated by the cognitive/affective factors in our research model.

Second, we were interested whether the control variable social media usage frequency moderates the relationship between perceived enjoyment and website stickiness since both factors are positively influenced by social

media usage frequency. After adding social media usage as a moderator, the result showed a nonsignificant moderation effect (0.077, $p>0.1$). To account for potential gender-specific differences, we additionally run a PLS multi-group analysis (MGA) using gender as the grouping variable. No significant differences in path coefficients could be found between the female and the male group.

Third, we were interested in finding out how the different levels of social commerce feature richness affect the three cognitive/affective factors (i.e., perceived usefulness, perceived enjoyment, and trust). Table 8 provides an overview of the mean values of the cognitive/affective factors across the four different treatment groups. The groups are defined by the four levels of social commerce feature richness (cf. section 4).

Table 8 Mean values of the cognitive/affective factors across the four treatment groups

		Cognitive/Affective factor					
		PU		PE		TR	
SCFR level	N	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Zero	39	4.546	1.136	3.796	1.413	4.745	1.049
Low	42	5.179	1.078	4.321	1.267	5.223	0.934
Medium	43	5.273	1.241	4.890	1.038	5.612	0.868
High	40	5.475	1.477	4.950	1.350	5.805	1.043

SCFR: social commerce feature richness; PU: perceived usefulness; PE: perceived enjoyment; TR: trust

To verify if the mean values were significantly different across the four treatment groups, we performed a multivariate analysis of covariance (MANCOVA). Social commerce feature richness represented the independent variable, while perceived usefulness, perceived enjoyment, trust represented the dependent variables. Control variables were included as covariates. MANOCVA test statistics (i.e., Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root) were significant ($p<0.001$) across all four treatment groups. The F-statistic was significant ($p<0.05$) for all dependent variables, which means that for each of the dependent variables significant differences exist across the treatment groups (see Table 9).

Table 9 MANCOVA results

Dependent variable	Sum of squares	df	Mean square	F	Sig. (p-value)
Perceived usefulness (PU)	10.531	3	3.510	3.799	0.012
Perceived enjoyment (PE)	16.294	3	5.431	6.341	0.000
Trust (TR)	21.447	3	7.149	8.406	0.000

Note: social commerce feature richness is the independent variable.

Table 10 provides more details on the differences of the dependent variables across the treatment groups. MANCOVA contrasts were computed by comparing the mean values of the three groups, in which our e-commerce website provided a certain level of social commerce feature richness, to the group, in which the level of social commerce feature richness was zero (control group).

Table 10 MANCOVA contrast results

		Dependent variable		
Contrast		PU	PE	TR
Low vs. zero SCFR	Contrast estimate	0.477	0.349	0.405
	Standard error	0.218	0.210	0.209
	Sig. (p-value)	0.030	0.099	0.055
Medium vs. zero SCFR	Contrast estimate	0.573	0.790	0.824
	Standard error	0.218	0.210	0.209
	Sig. (p-value)	0.009	0.000	0.000
High vs. zero SCFR	Contrast estimate	0.703	0.767	0.957
	Standard error	0.222	0.213	0.213
	Sig. (p-value)	0.002	0.000	0.000

SCFR: social commerce feature richness; PU: perceived usefulness; PE: perceived enjoyment; TR: trust

A comparison between the low and zero social commerce feature richness conditions showed a significant contrast ($p<0.05$) for the factor perceived usefulness. Thus, the low level of social commerce feature richness generated a significant difference in perceived usefulness when compared to the zero level. However, while the mean values for the other factors did also increase between the zero richness and the low richness condition, the contrasts for perceived enjoyment and trust were only weak significant ($p<0.1$). When increasing the level of social commerce feature richness to medium, the contrasts for all factors increased, resulting in a significant difference for perceived enjoyment ($p<0.001$) and trust ($p<0.001$) in comparison to the zero level. Moreover, the contrast for perceived usefulness became more significant ($p<0.01$). Finally, increasing the level of social commerce feature richness to high provided the highest and most significant contrasts for perceived usefulness ($p<0.01$) and trust ($p<0.001$). However, while the mean value for perceived enjoyment did also increase between the high richness and the medium richness condition, the contrast did not further increase ($p<0.001$).

6. Discussion

6.1. Key findings

Several findings result from our study. First, with social commerce feature richness, we provide a novel theoretical concept that can be used to specifically characterize the functional diversity of social commerce features

and the different kinds of social information that can be provided by these features. To illustrate how the concept can be operationalized, we took findings from prior studies on the design of social commerce initiatives into account. Specifically, we used the reference model of Huang and Benyoucef (2013) as an example to identify and combine functionally diverse social commerce features. The more layers of the reference model a set of social commerce features covers, the greater is the functional diversity and the higher is social commerce feature richness. As demonstrated in our experimental setting, the highest level of social commerce feature richness can be achieved when covering all four layers of the reference model with functionally diverse social commerce features. For instance, combining social profile pages with a rating and review tool, social wish lists, and a community feed addresses all four layers of the reference model and thus represents a high feature richness.

Second, we could show that social commerce feature richness has a significant positive impact on the stickiness of an e-commerce website by positively influencing consumers' perception of cognitive and affective factors. If an e-commerce website uses a functionally rich set of social commerce features and thereby provides different kinds of social information, it is thus likely that the website stimulates consumers' perception of perceived usefulness, perceived enjoyment, and trust more effectively, which in turn increases the website stickiness. As regards perceived usefulness, using a functionally rich set of social commerce features seems to support consumers in their shopping task more effectively and thus is evaluated with a higher usefulness. Referring to perceived enjoyment, providing a functionally rich set of social commerce features seems to increase consumers' feeling that using the website is interesting and fun. With respect to trust, it seems more likely that consumers perceive an e-commerce website as trustworthy, if the website contains a functionally rich set of social commerce features.

Third, considering the effects of the studied cognitive and affective factors, we could verify the results of prior studies that perceived usefulness has a significant positive effect on perceived enjoyment (Al-Maghrabi and Dennis 2011; Fu et al. 2018; Parboteeah et al. 2009). If a website makes it easier for consumers to search and purchase products, greater levels of enjoyment can thus be generated. Moreover, and in line with prior studies, we could show that perceived usefulness and perceived enjoyment have a significant positive effect on trust (Hwang and Kim 2007; Ogonowski et al. 2014). This illustrates that if a website supports consumers in their decision making and triggers positive emotions, it becomes more likely that consumers trust the website. Our results also provide additional evidence that all three cognitive and affective factors have a significant positive effect on the website stickiness (Benlian 2015; Li et al. 2006; Lin 2007; Polites et al. 2012). Consequently, if consumers perceive an e-commerce website as useful, entertaining, and trustworthy, it obviously becomes more likely that they will stick to it. In addition, the effects of our control variables indicate that, in our experimental setting, male

participants did tend to perceive the website as less enjoyable. In contrast, participants who are frequently using social media applications did tend to associate the website with more enjoyment and did stick longer to the website.

Fourth, according to the results of our post-hoc analysis, we could verify that the relationship between social commerce feature richness and the website stickiness is fully mediated by the three cognitive and affective factors. Moreover, the results of our post-hoc analysis revealed that the consumers' perception of the cognitive and affective factors are influenced differently, depending upon the level of social commerce feature richness. When the level of social commerce feature richness was low, only the contrast for perceived usefulness was significant while the contrasts for perceived enjoyment and trust were non-significant. When the level of social commerce feature richness was medium, the contrasts for perceived enjoyment and trust also became significant. Interestingly, while perceived usefulness provided the highest contrast in the low richness condition, perceived enjoyment and trust showed higher contrasts in the medium richness condition than perceived usefulness.

Considering the influence of perceived usefulness on perceived enjoyment and trust, it seems that the effects of social commerce feature richness and perceived usefulness might have accumulated. When increasing the level of social commerce feature richness to high, the highest contrasts for perceived usefulness and trust were also generated. However, the contrast for perceived enjoyment did not further increase in the high richness condition, which indicates that our experimental setting might have reached a certain threshold level.

Taken together, the results of our study show that higher levels of social commerce feature richness contribute to increasing the stickiness of e-commerce websites. This effect is achieved by manipulating consumers' perception of cognitive and affective factors that are attributed to the website. The obtained results moreover show that the effects of social commerce feature richness on such factors can vary depending on the integrated social commerce features and their functionality. Moreover, a certain level of social commerce feature richness appears necessary to significantly influence consumers' perceptions of the studied cognitive and affective factors.

6.2. Theoretical implications

The findings of our research have several implications for academia. Combining functionally diverse social commerce features is considered an important aspect in the design of social commerce initiatives, which has, however, hardly been conceptualized and empirically investigated so far (Curty and Zhang 2013; Huang and Benyoucef 2013). With social commerce feature richness, we therefore proposed a new concept to represent the diversity of social media-based functionality provided on an e-commerce website. To explain the theoretical mechanism behind social commerce feature richness, we built upon the media richness theory and took into account that functionally diverse social commerce features provide different kinds of social information. Social commerce

feature richness conceptually differs from media richness as the former argues about the functional diversity of social commerce features and the different kinds of social information that are provided by such features, while the latter argues about a communication medium's overall ability to convey information.

Consequently, while the media richness theory addresses an e-commerce website's information transmission capabilities only from a general perspective, the concept of social commerce feature richness enabled us to specifically focus on the different kinds of social information that can be generated by the social commerce features of a website. In so doing, we could show that increasing the range of social information by using functionally richer sets of social commerce features can make e-commerce websites stickier. The concept of social commerce feature richness thereby provides researchers with a new lens through which the social information conveyed on an e-commerce website can be examined more specifically.

To identify functionally diverse social commerce features that convey different kinds of social information, we chose to build upon the reference model proposed by Huang and Benyoucef (2013) as a first guideline. While our study was not meant to specifically evaluate this reference model, the results show that the more layers of the reference model a set of social commerce features covers, the higher is its level of feature richness and the greater is its effectiveness with respect to the resulting stickiness of the e-commerce website. The results of our study hence corroborate and theoretically substantiate the layers of the reference model. Nevertheless, we preferred to formulate the concept of social commerce feature richness in a more abstract way and independently of a concrete taxonomy. In so doing, it can also be operationalized by other, more refined taxonomies and feature classifications that are developing in the social commerce domain.

This study also contributes a novel research model that is structured according to the S-O-R model and establishes a theoretically grounded link between social commerce feature richness and the website stickiness through consumers' perception of cognitive and affective factors. With the establishment of this link, we follow calls in literature to take the IT artifact(s), such as represented by social commerce feature richness, into account when studying users' perceptions and behavioral responses in IT contexts (Benbasat and Zmud 2003; Orlikowski and Iacono 2001). Investigating the effects of social commerce feature richness is important given the fact that so far no clear statement can be derived from literature whether functionally richer sets of social commerce features may have positive or negative effects on the website stickiness (Hsu and Liao 2014; Huang and Benyoucef 2017; Park and Lee 2008).

With our study, we provide empirical evidence that the stickiness of an e-commerce website can be increased if functionally richer (i.e., diverse) sets of social commerce features are used. With respect to the potential

effects of social commerce feature richness, our study could show that social commerce feature richness has a significant positive effect on consumers' perception of perceived usefulness, perceived enjoyment, and trust, which in turn positively affect the website stickiness. While a few studies have investigated how specific social commerce features (Brengman and Karimov 2012; Kumar and Benbasat 2006) or specific website characteristics (Grange and Benbasat 2010; Mikalef et al. 2012; Mikalef et al. 2013; Zhang et al. 2014) can affect cognitive and affective factors, it has not been investigated so far how different combinations of social commerce features influence cognitive and affective factors in combination. In this context, we could also demonstrate that the effects of social commerce feature richness can vary and that a certain level of feature richness appears to be necessary to effectively stimulate consumers' perception of cognitive and affective factors.

While prior studies have investigated how cognitive and affective factors can affect consumers' intention to stick to a website (Benlian 2015; Li et al. 2006; Lin 2007; Polites et al. 2012), this study links the effects of the cognitive and affective factors to the consumers' actual website usage behavior instead of their intention. Following recommendations in literature, we particularly measured website stickiness through various website metrics that we collected from the participants' clickstream data during our experiment (Mallapragada et al. 2016; Olbrich and Holsing 2011; Tangmanee 2017). While tracking actual behaviors in general is more difficult, such an approach avoids the limitation that self-reported intentions through survey data can be biased and thus may not accurately reflect actual behavior (Chandon et al. 2005; Huseynov and Yildirim 2015; Morwitz et al. 2007). This study therefore also provides a new perspective on how website stickiness as an actual behavioral outcome is affected by consumers' perception of cognitive and affective factors.

6.3. Practical implications

Our study also provides several implications for practice. Up to now, a wide range of functionally diverse social commerce features has been produced that can be integrated into e-commerce platforms. For companies, it therefore becomes critical to understand if and how functionally diverse social commerce features should be used in combination and what impact such endeavors may create. Based on the concept of social commerce feature richness, this study illustrates how companies can effectively combine functionally diverse social commerce features to increase the success of their e-commerce platforms. For the evaluation of this concept, we created several variants of an experimental e-commerce website, in which different sets of social commerce features were integrated. With our websites, we provide realistic and fully functional prototypes that illustrate how various social commerce features (i.e., social profile pages, rating and review tools, social wish lists, community feeds) can be used in combination. The results of our experiment demonstrate that the effect of social commerce initiatives may

be strengthened most effectively when integrating social commerce features with a different type of functionality. For instance, we could show that combining a community feed with social wish lists, a rating and review tool, and social profile pages is more effective concerning the stimulation of consumers' perception of cognitive and affective factors than just using a rating and review tool with social profile pages. Hence, our findings support practitioners to derive first insights about what combinations of social commerce features may be more effective.

Considering that website stickiness is as a critical factor for the success of e-commerce websites (Davenport 2000; Lin et al. 2010), our study provides practical guidelines on how social commerce initiatives can be used to increase the website stickiness. According to our results, we could show that if an e-commerce website provides a functionally richer set of social commerce features, consumers tend to stay longer and interact more with the website, which results in an increased website stickiness. As shown by extant literature, the higher the website stickiness, the more likely that consumers will make a purchase and that they will become loyal customers (Lin 2007; Lin et al. 2010). Companies should therefore aim at integrating functionally richer sets of social commerce features into their e-commerce websites. With respect to the measurement of website stickiness, this study used concrete website metrics that we collected from the users' clickstream data. Such website metrics are also provided by modern e-commerce platforms and website analytic tools. Hence, practitioners can use similar website metrics as we did in our study to monitor how social commerce initiatives affect their e-commerce websites.

With respect to the cognitive and affective factors, our results demonstrate that companies should ensure that the selected social commerce features support consumers in their shopping task to increase the perception of perceived usefulness. Moreover, companies should ensure that the selected features convey a sense of fun and entertainment to increase the perception of perceived enjoyment. Finally, the selected features should give consumers an impression that the company behind the website acts in their best interest to increase consumers' trust in the website. In this context, it is also important that consumers frequently use these features to interact with each other and to generate socially rich content. Frameworks such as the customer engagement cycle developed by Sashi (2012) may support companies in finding out how they can effectively turn their customers into supportive advocates. Moreover, companies should also have a strategy on how to interact with consumers through these features. In this context, Sparks et al. (2016), for instance, could show that if companies respond to negative social information, it becomes more likely that consumers find the company and its website trustworthy.

The results of our study also indicate that consumers perceptions and responses may vary depending on individual characteristics, such as their gender or how often they use social media applications. While gender was only nearly significant in our study, Huang and Benyoucef (2017) did find significant differences between male

and female consumers with respect to how they evaluate different social commerce design aspects within their purchase decision-making process. Therefore, companies should keep the individual characteristics of their target group in mind when planning to enrich their websites with social commerce features.

6.4. Limitations and future research

Our study also has several limitations, which offer avenues for future research. First, we deliberately decided to focus on the factors perceived usefulness, perceived enjoyment, and trust as prior literature provides evidence that these factors can significantly influence the website stickiness (Benlian 2015; Li et al. 2006; Lin 2007; Polites et al. 2012). Moreover, sporadic evidence is given that these factors may be influenced by social commerce features (Brengman and Karimov 2012; Hajli 2013; Kumar and Benbasat 2006; Liu and Park 2015). However, social commerce feature richness may also influence other factors that have not been considered, such as social factors (perceived social presence, perceived social support), risk factors (e.g., privacy risk, financial risk), or product-related factors (e.g., perceived product quality, product type) (e.g., Bai et al. 2015; Featherman and Hajli 2015; Liang et al. 2011; Sharma and Crossler 2014; Shen 2012). Future studies could therefore explore in which way social commerce feature richness influences such factors. An increased social commerce feature richness may also generate negative side effects, such as information overload, which we did not consider and measure in our study (Cheung et al. 2014; Furner and Zinko 2016; Zhou and Guo 2017).

Regarding the outcome variable, we focused on website stickiness since it is considered as a critical success factor for companies operating e-commerce websites (Li et al. 2006; Zott et al. 2000). While website stickiness can predict purchases (Lin et al. 2010), such an indicator is not as accurate as when measuring consumers' concrete purchase behavior. Consequently, future studies could enrich our findings by taking additional outcome variables, such as consumers' purchase behavior, into account.

Moreover, we decided to conduct a controlled experiment as it provides results with a high internal validity and as it enabled us to manipulate social commerce feature richness on an e-commerce website in a systematic manner. Although we have taken care to simulate a realistic case, we had to make some reasonable but strict assumptions. For instance, all participants in our experiment had a concrete shopping task, which differs from natural e-commerce settings in which consumers may only browse a website to inform themselves about products or in which consumers may make a purchase impulsively (Parboteeah et al. 2009; Pavlou and Fygenson 2006). To advance the external validity of our findings, future studies are hence encouraged to complement our findings with data from productive environments.

So far, students of a German university were the only participants in our experiment. We were hence not yet able to investigate demographic and/or cultural differences, which can have significant effects in e-commerce contexts (Cyr 2008; Moon et al. 2008; Ng 2013; Pavlou and Chai 2002). Moreover, by using a student sample, we were not able to claim that the reported effects are generalizable to other types of consumers. Likewise, we cannot claim that the reported effects apply for social commerce scenarios in general, since we only focused on a fictitious company that sells unbranded gift gadgets. The participants were hence not familiar with the website and acted as first-time visitors. Since factors such as trust can develop over time (Kim et al. 2009), and since the stickiness of a website can also be assessed as its continued (re-) use over a longer time period (cf. section 2), future research could also focus on conducting longitudinal studies.

Depending on their functional characteristics, social commerce features may influence cognitive and affective factors differently. Hence, future studies could also enrich our findings by investigating, comparing, and cataloging the effects stirred by individual social commerce features. The research model and the experiment design described in this manuscript may provide a blueprint for such endeavors. However, the effects of social commerce features on cognitive and affective factors may also vary depending on the way social information is processed. In our experiment, participants used social commerce features mainly to consume social information during the shopping task. If a task requires consumers to create social information, the effects on cognitive and affective factors may for instance be different, because consumers may also evaluate the features based on their support to generate social information. Future studies are hence also encouraged to complement our findings by taking additional usage forms of social commerce features and tasks into account. To get a more in depth understanding of the effects of functionally diverse social commerce features, future studies could moreover employ more advanced tracking techniques, such as eye tracking or EEG monitoring.

Referring to the implementation of social commerce features, we so far did only investigate four different social commerce features in one specific implementation order. While we carefully selected the four features according to the reference model of Huang and Benyoucef (2013), there exist additional features that we did not examine, such as live chat tools or group buying tools (Curty and Zhang 2013). To investigate such features, we would have to make sure that the participants simultaneously browse the experimental website, which, however, requires a different and more restrictive experimental setting. The reference model also helped us to determine the implementation order of the features. However, it should be noted that the reference model has not been empirically evaluated so far and that the reference model only makes suggestions about the order of abstract design layers and not about concrete social commerce features. Additional research is thus necessary to investigate the effects

of different implementation orders of social commerce features more systematically. To a considerable extent, the impact of different sets of social commerce features will moreover depend on the quality of their implementation. Future studies hence should also investigate the impact of different implementations of social commerce features, which we did not examine so far.

Besides their implementation, it is also important that social commerce features provide the right amount of content that consumers need for making their purchase decisions (Ding et al. 2017; Zhu and Huberman 2014). In our experimental setting, we kept the amount of content constant for each social commerce feature to avoid potential effects that are related to different levels of content. Future studies could therefore explore how different levels of content provided through social commerce features influence consumers' perception of cognitive and affective factors and the subsequent website stickiness.

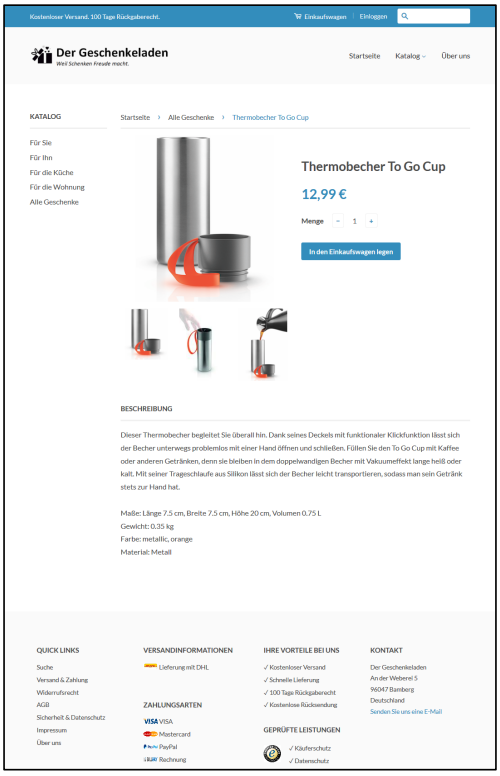
6.5. Concluding remarks

Website stickiness is a critical factor for the success of e-commerce websites. Although the advent of social commerce has made available a whole kind of new website features, the unique and characteristic effects, which functionally diverse sets of social commerce features might have on the website stickiness, have remained largely unexplained. With the concept of social commerce feature richness, we provide a novel theoretical lens to characterize the diversity of social media-based functionality being provided on an e-commerce website. With the proposed research model, we moreover provide an instrument, through which the causal relationship between social commerce feature richness, the consumers' perception of cognitive and affective factors, and the website stickiness can be analyzed systematically.

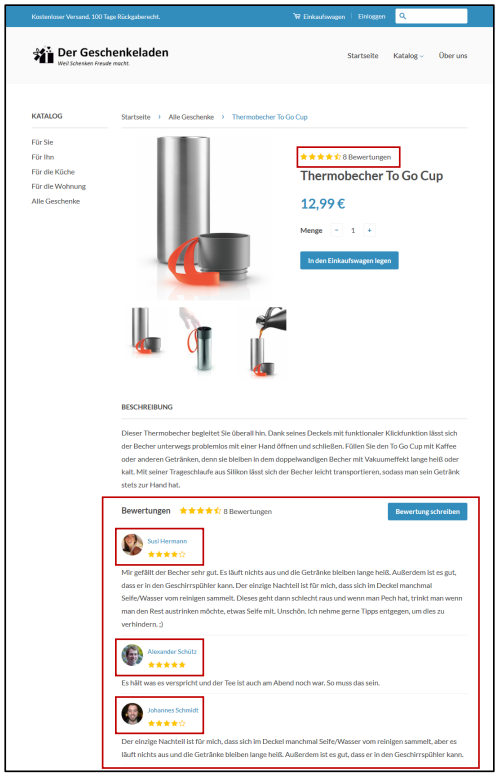
The results of our study particularly highlight the importance of acquiring a profound understanding of the effects that social commerce feature richness has on the website stickiness. Our results demonstrate that using functionally richer sets of social commerce features can uniquely affect the consumers' perception of cognitive and affective factors, which in turn can have a direct and positive impact on the website stickiness. Social commerce initiatives accordingly can provide a unique and innovative means to improve the effectiveness of e-commerce websites.

Appendix A: Product page examples

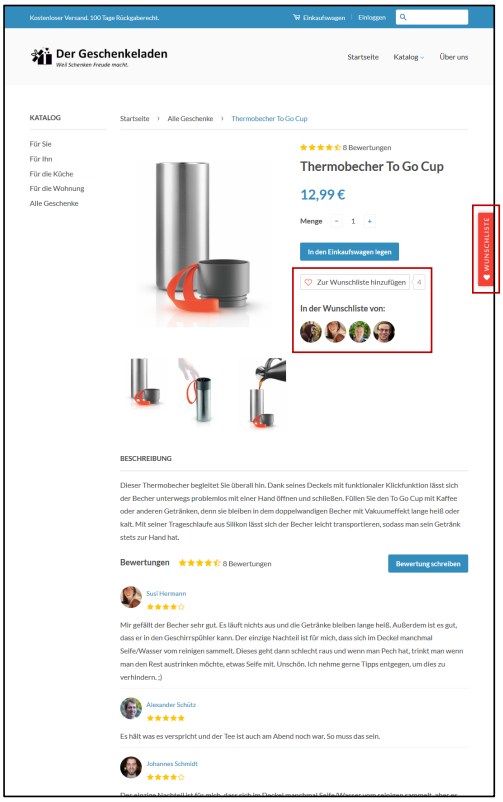
1. Product page version 1 (zero richness level)
No social commerce features



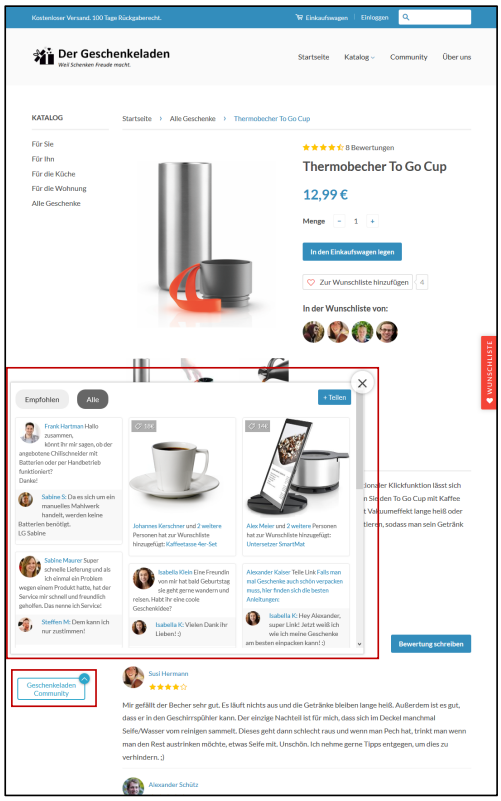
2. Product page version 2 (low richness level)
Highlighting social profiles and rating and review tool



3. Product page version 3 (medium richness level)
Highlighting social wish lists



4. Product page version 4 (high richness level)
Highlighting community feed



Appendix B: PLS cross-loadings

	Construct			
Item	PU	PE	TR	WS
PU1	**0.891**	0.542	0.446	0.401
PU2	**0.888**	0.511	0.439	0.306
PU3	**0.778**	0.492	0.413	0.360
PU4	**0.893**	0.596	0.488	0.431
PE1	0.606	**0.880**	0.532	0.486
PE2	0.500	**0.835**	0.389	0.358
PE3	0.469	**0.848**	0.374	0.420
PE4	0.503	**0.804**	0.408	0.385
TR1	0.400	0.319	**0.846**	0.332
TR2	0.352	0.299	**0.858**	0.327
TR3	0.420	0.421	**0.886**	0.354
TR4	0.548	0.617	**0.718**	0.403
TR5	0.366	0.371	**0.834**	0.383
NCU	0.406	0.455	0.421	**0.902**
NPU	0.367	0.443	0.374	**0.915**
TSU	0.404	0.433	0.397	**0.881**

PU: perceived usefulness; PE: perceived enjoyment; TR: trust; WS: website stickiness

Appendix C: Effects of control variables

Path	Path coefficient	t-value	p-value
Age → PU	-0.099	1.497	0.134
Age → PE	0.036	0.466	0.642
Age → TR	-0.085	1.017	0.309
Age → WS	0.109	1.582	0.114
Gender → PU	-0.104	1.374	0.170
Gender → PE	-0.116	1.912	0.056
Gender → TR	-0.075	1.111	0.267
Gender → WS	0.106	1.572	0.116
IUF → PU	0.065	0.791	0.429
IUF → PE	-0.039	0.580	0.562
IUF → TR	0.080	1.038	0.299
IUF → WS	-0.017	0.260	0.795
OSF → PU	-0.023	0.296	0.767
OSF → PE	0.067	1.152	0.249
OSF → TR	0.019	0.310	0.757
OSF → WS	-0.036	0.570	0.569
SMF →PU	0.091	1.146	0.252
SMF →PE	0.132	1.943	0.052
SMF →TR	0.011	0.167	0.868
SMF → WS	0.178	2.522	0.012

PU: perceived usefulness; PE: perceived enjoyment; TR: trust; WS: website stickiness; IUF: internet usage frequency; OSF: online shopping frequency; SMF: social media usage frequency

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