Theoretical-empirical Article

Interaction Effects between Online Reviews and Product Characteristics on Consumer's Trust

Efeitos de Interação entre Avaliações On-line e Características do Produto na Confiança do Consumidor

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■ ABSTRACT

Objective: the present study analyzes the relationship between online reviews and consumer trust in online stores, considering the conjoint effects of the characteristics of online reviews and product offers in the social commerce context. **Methods:** the study is characterized as a laboratory experiment that simulated the environment of an online store considering different scenarios, totaling 602 cases for analysis. **Results:** the results indicate that the relationship established between the consumer and the reviewers moderates the relationship between reviews and trust, suggesting that positive and negative reviews from friends and acquaintances affect the consumer's trust more than those reviews made from strangers. However, this effect is not always significant, depending on the price offered. Still, the type of the product moderates the effect of the online reviews on trust when the store displays higher prices than the competition. In such cases, the impact of reviews on trust is more intense in high-value product advertisements. **Conclusions:** the study can help managers and website developers create more appropriate processes and strategic alternatives in the social commerce context, based on a better understanding of the relationships among the variables studied in this research.

Keywords: e-commerce; social commerce; trust; online word of mouth; social networks.

■ RESUMO

Objetivo: o estudo analisa a relação entre as avaliações on-line e a confiança do consumidor nas lojas on-line, considerando os efeitos conjuntos das características das avaliações on-line e das ofertas de produtos no contexto do comércio social. **Método:** o estudo se caracteriza como um experimento de laboratório que simulou o ambiente de uma loja on-line considerando diferentes cenários, totalizando 602 casos para análise. **Resultados:** os resultados indicam que a relação estabelecida entre os consumidores e quem faz os comentários on-line modera a relação entre as avaliações realizadas e a confiança, sugerindo que as avaliações positivas e negativas de amigos e conhecidos afetam mais a confiança do consumidor do que as avaliações feitas por estranhos. No entanto, esse efeito nem sempre é significativo, dependendo dos preços ofertados. Ainda assim, o tipo de produto modera o efeito das avaliações on-line sobre a confiança quando a loja exibe preços mais altos que os da concorrência. Nesses casos, o impacto das revisões na confiança é mais intenso em anúncios de produtos de alto valor. **Conclusões:** o estudo pode ajudar gestores e desenvolvedores de sites a criarem processos e alternativas estratégicas mais adequadas no contexto do comércio social, a partir de um melhor entendimento das relações entre as variáveis estudadas nesta pesquisa.

Palavras-chave: e-commerce; comércio social; confiança; boca a boca eletrônico; redes sociais.

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INTRODUCTION

The emergence of technologies such as blogs and social networks has provided different business opportunities, stimulating the interest of academics and practitioners. Studies on the interaction between users and business initiatives attentive to the use of these social technologies in commercial activities gave rise to what has been called social commerce, or s-commerce (Liang & Turban, 2011; Lin, Li, & Wang, 2017). In this context, consumers — participants in social networks — express themselves, being able to influence and be influenced in purchasing decisions, besides sharing reviews about products and services. In fact, social media — more specifically the roles of social participation in social media — has deeply changed people's way of life, being established as an important forum for e-commerce (Bilal, Akram, Rasool, Yang, & Tanveer, 2021), helping customers make better purchase decisions and challenging the contemporary administration in the current world (Bispo, 2022). The present study explores the relationship of these online reviews and the consumer's trust in the online store, analyzing the inclusion of some product characteristics of the offer as an investigative novelty. We conjecture that such characteristics may influence the consumer's attention to online reviews and, further, to trust in the online store.

The roots of social commerce date back to the late 1990s, when two pioneering e-commerce companies, Amazon and eBay, introduced features that allowed customers to write product reviews or assess salesperson performance. In 2005, Yahoo introduced the term 'social commerce' to describe a new collaborative feature in its shopping platform that allowed consumers to create, share, and comment on product lists (Han, Xu, & Chen, 2018). However, it is with the emergence of Web 2.0 and social media that e-commerce companies started to integrate new technologies into their websites to offer consumers a more social and interactive shopping experience (Friedrich, 2017; Lin et al., 2017). In this sense, platforms like Facebook and Instagram have increasingly influenced consumers, who make 'informed purchases,' which enable them to obtain better products, services, and prices through the exchange of information with other consumers — being characterized as a unique aspect of the social commerce (Ahmad & Laroche, 2017; Kim & Park, 2013).

In academia, the volume of scientific studies interested in the topic 'social commerce' is growing, highlighting trust as one of the most frequently mentioned underlying theories (Han et al., 2018; Lu, Fan, & Zhou, 2016). Trust proves to be crucial in understanding the intentions of the purchasing behavior of consumers (Hajli, 2020; Lu et al., 2016; Pavlou, 2003), playing an important role in the formation of positive attitudes toward the decision to buy (or not) a product on the internet (Cheng, Gu, & Shen, 2019). Nevertheless, a survey carried out by Nielsen (2015) suggested that consumers usually trust other consumers — especially the recommendations of friends and family — more than the traditional companies themselves or even those formal sources of information (Flanagin, Metzger, Pure, Markov, & Hartsell, 2014). However, as Han, Xu, and Chen (2018) conclude after conducting a dense systematic literature review on social commerce, summarizing the results of 407 articles published in academic journals between 2006 and 2017, there is still a need for the development of research that adopts predictive models to uncover consumer behavior patterns, identify complex relationships among variables, and bring new knowledge on e-commerce research.

One gap perceived on this topic involves the management of attention (Davenport, 2004), in which consumers should pay more or less attention to one or another information, depending on the importance they devote to the situation experienced — such as, for example, the purchase of a product or service in a website. In this perspective, Menon, Sigurdsson, Larsen, Fagerstrøm, and Foxall (2016) investigated the consumer attention to price in social commerce, pointing out that future research may extend the studies to analyze the fixation of attention on other areas of interest, such as likes, comments, or advertisements.

In this sense, we aimed to analyze the relationship between online reviews and consumer's trust in online shopping, considering different types of reviews, products, and offer prices. The main effects of online reviews and the interaction between product type and offer prices on consumer's trust are explored in depth. In doing this, we expect to further investigate possible differences in the relationship between online reviews and consumer trust on s-commerce firms, considering recommendations from peers of the social network (peer group), non-peers, different products, and different prices from the competition.

The influence of such aspects is not clearly manifested, being underlying and related to the human attention. According to Davenport (2004), if firms want to ensure that their most important information is effectively viewed, generating actions, they must begin to be concerned with the management of attention. It is essential in this regard to know what consumers focus on and direct information effectively to get better results.

LITERATURE REVIEW

It has been observed in the literature the absence of a clearly established definition for the term 'social

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commerce.' In fact, there is a common understanding about its composition that consists of the interaction of two elements: online social media and electronic commerce (Braojos, Benitez, & Llorens, 2019). Social media makes use of information and communication technologies that facilitate the creation and sharing of information, with social networking sites (SNS) representing one of the main applications of social media today (Maia, Lunardi, Longaray, & Munhoz, 2018).

In this sense, social commerce uses social networks to improve the online shopping experience, allowing consumers to search for information and share opinions about their purchases. In addition, they can obtain knowledge and advice from individuals in their networks on any product, which certainly will influence their purchasing decision-making process (Lin et al., 2017). Consumers have the possibility to compare opinions (Ahmad & Laroche, 2017; Kim & Park, 2013), prices, and recommendations, which will affect their trust in the online store (Maia, Lunardi, Dolci, & D'Avila, 2019; Zhang & Benyoucef, 2016). It is worth highlighting a recent stream of research denoted the 'dark side' of social media — a flow that investigates social media as risks for individuals, communities, companies, and society as a whole (Baccarella, Wagner, Kietzmann, & McCarthy, 2018). The present research does not adopt this perspective, focusing on what can be denoted as the 'bright side' of social media, which helps understand opportunities afforded by these technologies to individuals and organizations. In order to theoretically sustain some possible relationships to be tested empirically in this study, we reviewed the literature as follows.

Relation between trust and online reviews

Trust implies believing in the company and the product, and it is present when a party has faith in the partner's integrity and dignity (Morgan & Hunt, 1994). According to Gundlach and Murphy (1993), trust has proved to be the most accepted variable as the basis for human interaction and exchange relationships, leading people to believe that the other part will comply with their obligations without acting badly. Kim and Peterson (2017) assert that consumer trust is an important aspect that has been frequently studied in the e-commerce literature, typically conceptualized as a mediator between selected antecedents and consequences such as the intention to use or revisit an e-commerce website, or even buy a product or service on the internet.

According to Hajli (2015), the consumer's level of familiarity with a firm tends to increase when they read comments and reviews of products or services on its social networks, enhancing his/her trust when carrying out a transaction. Usually, individuals appeal to internal

(through previous experiences) or external search, through the use of the internet or social networks (Lee & Lee, 2011) — this is considered as a key feature of social commerce as consumers search for additional information related to products or services they wish to buy, viewing comments or experiences shared by other customers about the products sold. Consumers attach great importance to the opinion of others, whether positive or negative, using it sometimes as the predominant (even unique) source of information.

Researchers have named the behavior through which consumers transmit their experiences and opinions based on comments through the internet as 'online word-of-mouth' (Awad & Ragowsky, 2008). According to Hajli, Hajli and Khani (2013), 'social word-of-mouth,' a term most recently used by certain authors to highlight when reviews occur through social media, increases the level of trust in new products among users, who are influenced by other buyers, due to the uncertainties that online shopping generates.

In this sense, positive reviews work as an effective tool, in the same way that negative ones can generate doubts and decrease the purchase intention in social commerce. Thus, we propose the first hypothesis:

H1: Positive online reviews will generate more trust than a lack of reviews, while negative reviews will have the opposite effect.

Moderating effects of the relationship between trust and online reviews

Smith, Menon, and Sivakumar (2005) examined the influence of recommendations on consumer decision-making during online shopping experiences. They concluded that the impact that recommendations have on consumers is influenced by characteristics of the recommendation, the product, and the purchase goals of the consumer. In this study, we aim to empirically research part of these influences as moderating effects of the relationship between online reviews and consumer's trust in the company that is offering the products.

Liang and Turban (2011) state that the difference between sharing opinions in social commerce and the traditional review on an e-commerce site is that what is done via social networks focuses on one's network of contacts, while traditional review is shared with predominantly unknown buyers. Currently, the technologies present on social commerce websites allow reviews, comments, recommendations, and references. In addition, consumers can connect with their social networks and view comments from their friends, which help them in their purchasing decision-making process (Hajli, 2015). Complementarily, some studies have highlighted that in addition to the

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importance of the recommendations made by third parties, usually they are more effective when they come from people from the consumer's social circle, that is, from their peers such as friends and family (Cheung, Xiao, & Liu, 2014; Yan et al., 2016). In this perspective, consumers would give more weight to information received from their friends on social networks than from people outside their social circle. In light of the above mentioned, we hypothesize that:

H2: The social relationship between the consumer and the online reviewers — social network peers or not — will act as a moderating variable in the relationship between online reviews and consumer's trust.

Additionally, the type of product and its price in relation to the competition can affect, in some ways, the relationship between reviews and consumer's trust in the online market. In offers with low value goods (e.g., CDs, books, household appliances), the consumer risk tolerance is higher and a disappointing purchase in an online transaction such as a false or malicious website, a delivered product being different from the advertised, or even a delay or non-delivery of the product will be less severe because of this low-investment condition, being the consumer more likely to purchase. In this situation, financial risk is perceived in a lesser extent. In contrast, for higher values, trust is a critical component to the online store because risks associated with online transactions are perceived to be high (Ventre & Kolbe, 2020), causing the consumer to pay more attention to positive reviews from third parties, since the cost of the transaction will be higher.

Karmarkar, Shiv, and Knutson (2015) assert that price is one of the most critical aspects of the purchase process, as consumers can spend time and effort to acquire information about the price, especially for high-value products. According to Churchill and Peter (1998), in the purchase of a high-value good, there is a greater rationality in the decision-making process for the purchase of this type of product, compared to one of low monetary value. In fact, Maia, Lunardi, Longaray, and Munhoz (2018), in their survey with Brazilian consumers, identified that the use of recommendations, reviews, and comments by third parties was more significant in situations involving the purchase of more expensive products over the internet than in situations involving products of lower value such as books, clothes, and beverages. Therefore, we hypothesize as follows:

H3: The type of product — high or low value — will act as a moderating variable in the relationship between online reviews and trust.

In this investigation, in addition to the product characteristics, aspects related to the price charged by the online store are included. Kim and Park (2013) consider the economic gain of online businesses as an important factor that influences the consumer's trust in this environment. On the other hand, consumers may hesitate to buy over the internet due to concerns about perceived risk, including the financial aspect. It seems like a paradoxical phenomenon; after all, one of the main advantages of online stores is the possibility of purchasing products and services at low prices (Lu et al., 2016), an important feature of the online market from the perspective of consumers (Lee & Lee, 2011; Maia et al., 2018). However, it is valid to speculate the feeling of the consumer distrust when he/she faces an offer from an online company that has much different prices, mainly below those practiced by the competition. This is reminiscent of the popular Portuguese proverb "When alms are too much, the saint is suspicious." In popular belief, it means that you should be suspicious when the offer is too good.

Li, Rhee, and Moon (2018) focused on the online commerce in China to reveal at which discount rate the consumers start to have distrust toward a product. They investigated several products; for a TV set, for example, they found that consumers start to have distrust when the price has a discount rate of 55%. Additionally, this point becomes even more interesting as consumers in social commerce have the possibility to compare opinions and prices much more easily (Kim & Park, 2013; Sullivan & Kim, 2018). Different tools are available on the internet for price comparison that can help consumers to obtain reference prices, allowing them to assess whether the offer is more expensive or cheaper than the competition (Sullivan & Kim, 2018).

In this sense, it is valid to discuss whether practicing prices below the competition can have any negative effect on consumer's trust on a s-commerce firm and whether positive reviews about the online store minimize any negative effect due to the price this firm practices. Customer opinions have great influence on the sales of the companies (Ventre & Kolbe, 2020). Therefore, online firms can generate more value from comments, reviews, and recommendations from third parties (Lin et al., 2017). If the firm receives positive reviews, the performance of its online sales is less likely to be influenced by the price (Lin et al., 2017); in other words, positive recommendations imply an improvement in company's reputation, and the company's reputation is related to several performance indicators, such as price premiums, return on assets, and long-term survival (Lam, Yeung, Lo, & Cheng, 2019).

For Guo, Wang, and Leskovec (2011), the question to be investigated is how much extra a buyer will pay for a transaction with a highly rated seller. The authors note a small but super-linear effect of the sellers' rating on the price premium they can charge keeping engaged in transactions. Kim and Peterson (2017) assess that the future of the

B2B e-commerce would be not promising without online trust, confirming that price is not the main determinant of the online purchase (Maia et al., 2019). Here, price is not planned as a determinant of trust, but as a moderating variable in the relationship between online reviews and consumer trust. This investigative line is explored based on the following hypothesis:

> **H4:** The product price in relation to the competition — more expensive or cheaper — will act as a moderating variable in the relation between online reviews and consumer's trust.

In addition to the variables present in the hypotheses, this study explores the inclusion of other candidate variables to improve the model's fit. For example, our study analyzes the income and the closeness of the relationship between buyer and review composer. The customer's income may influence the importance of the review for him/her, depending on the offer — product and its price — that is posted with the review. In a similar vein, the proximity of the relationship between buyer and reviewer may affect the consumer trustworthiness, which can further determine his/her trust in the online reviews (Dong, Li, & Sivakumar, 2019) and, consequently, in the online store. Next, we present the methodological procedures followed in the study.

METHODOLOGY

The study is characterized as a laboratory experiment, consisting of manipulating different scenarios and variables. The research environment was created by the authors and carried out with a sample of members of the social network Facebook. In order to test the proposed hypotheses of the study, we developed a fictitious online sales website, reproducing the environment of a s-commerce firm (Appendix A). We configured different scenarios and the manipulation of the following variables: online reviews, relationships in the social network, type of product offered, and price variation in relation to the competition. The manipulated variables were introduced in the model as exogenous variables.

It is worth noting that the experiment used the name of real companies to simulate competition (presented herein with blurred visual effect), as well as the real prices of the goods offered on the websites, trying to make the experiment as realistic as possible. Next, we detail the experimental design, the sample characteristics, and the questionnaire applied in the study.

Experimental design

The experiment was conducted in a controlled environment, using a 3 x 2 x 2 x 2 factorial design, with the following variables being manipulated in the built scenarios: (a) Online Review: 3 levels — positive review (positive), negative review (negative), and no review (neutral); (b) Relationship: 2 levels — peer is a friend on the social network (acquaintance) and people without a relationship (stranger); (c) Product: 2 levels — high price (HP) and low price (LP); and (d) Price Variation: 2 levels — higher (HC) and lower (LC) price than the competition.

The characterization of each controlled variable used in the study is as follows: (a) Positive: positive review, characterized in the experiment by opinions present on the website, indicating and encouraging the purchase; (b) Negative: negative review, characterized in the experiment by opinions present on the website, whose message discourages the purchase by addressing negative aspects of the product or online store; (c) Neutral: nether positive nor negative review; (d) Acquaintance: characterized in the experiment by the photo of people the respondent knows, who are among his/her contacts on the Facebook social network; (e) Stranger: characterized in the experiment by photos of people unknown to the respondent, who do not have any relation on Facebook; (f) HP: product of high monetary value, characterized in the experiment by a 39" full HD smart LED TV; (g) LP: product of low monetary value, characterized in the experiment by a 32 GB USB flash drive; (h) HC: Product with a higher price than the competition, characterized by the display of values proposed by competitors below the sale value of the website; and (i) LC: product with a lower price than the competition, characterized by the display of values proposed by competitors higher than the sale value of the website.

The offer prices presented on competing websites varied for the high-value product (TV set) between 6.6% and 14.7% above those offered by the competition and between 17.5% and 30.6% below the competition; for the low-value product (USB drive), this variation was between 24.9% and 40.5% above the competition and between 2.7% and 13.6% below the competition. The suggested values had this variation because, as mentioned previously, real values taken from real online stores were used. We did this aiming to increase the external validity of the experiment.

Sample

The sample is classified as non-probabilistic, with respondents selected by convenience from the social network Facebook. Invitations were sent by one of the authors via chat from the mentioned social network, along with a link requesting participation in the study. This link redirected

participants to one of the fictitious websites created for the study, asking them to consider that they were really searching for the product presented in the website. Due to the peculiarity of the experiment, when the manipulation was about recommendations from 'friends' on the social network it was necessary to ensure for some scenarios that the respondent met the people who were making comments on the experiment website. This procedure was done through an automated script integrated and executed within the internet browser, picking up some real names and photos from the respondent's profile. The reverse was programmed when looking for the presentation of scenarios with strangers' reviews, including fake names and photos.

Additionally, in order to maintain a homogeneous distribution of the number of participants per case (scenario), for each respondent who agreed to participate in the study, the automated script also selected the scenario with the least amount of responses in the study, with two more scenarios randomized from it, with the same product (TV set or flash drive) and the same price (higher or lower) in relation to the competition, varying only the type of review (positive from acquaintances, positive from strangers, negative from acquaintances, negative from strangers, or no comments at all). Each of the participants was submitted to the three

randomized scenarios, answering the same questionnaire one at a time. The order in which the website conditions were viewed was randomly assigned to eliminate possible order effects. Similar procedures were used by Cyr, Head, Larios, and Pan (2009) in their research.

Data was collected in the end of 2014. We obtained answers from 251 respondents, resulting in 679 cases available for analysis. In order to make the experiment as closest to reality as possible, we opted to analyze only responses from people who had already made purchases on the internet. Similarly, 23 cases included as scenarios with reviews made by strangers were not considered in the analyses since the respondent informed that people close to him/her were carrying out the reviews (failing in the check manipulation process) — resulting in 602 cases in 20 experimental groups. We verified the sample size adequacy using G*Power 3.1.9.4 software and observing the conventional parameters (F-test, one-way ANOVA, effect size f = 0.25, alpha error probability = 0.05, power = 0.8, and number of groups = 20). The calculated minimum sample was estimated in 345 cases, indicating that the sample size in this study is adequate. Table 1 summarizes the experimental design.

Table 1. Distribution of respondents by experiment group.

Review	Product 1 — High price (TV set)		Product 2 — Low price (flash drive)	
	Lower price than the competition	Higher price than the competition	Lower price than the competition	Higher price than the competition
Positive peer review	31*	31	33	32
Positive review by strangers	27	24	29	26
No review (neutral)	29	33	31	32
Negative peer review	31	28	29	31
Negative review by strangers	30	29	33	33

Note. *Scenario presented in Appendix A.

The sample proved to be homogeneous in relation to gender, with 55% female and 45% male respondents. The predominant age groups were concentrated between 18 and 29 years (45.3%) and 30 and 44 years (44.5%). Regarding marital status, married couples represent 49.1% of the sample and singles 47.6%. The predominant family income ranges were concentrated between two and four Brazilian minimum wages (25.8%), between four to six (31.4%), and more than seven Brazilian minimum wages (26.7%). With regard to usage habits in relation to the internet and social networks, most respondents (70.8%) usually access social networks more than once a day, as well as 71.1% has preference for using Facebook. Another relevant fact

is the high percentage (83.5%) of people who usually access recommendations made by third parties with some frequency to make these purchases.

Instrumentation and measures

Participants were directed to the link corresponding to the first proposed scenario, which, after viewing, was evaluated through a questionnaire containing socio-demographic questions and some queries regarding their online shopping behavior related to social network sites. Trust was the only latent variable measured as reflective, being adapted by Kim and Park (2013). To measure it,

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we used a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). The items were translated from English to Portuguese, and then translated back to English, to complete the reverse translation process.

Validation

The questionnaire was analyzed by members of the research group to which the study authors are linked, in order to minimize possible inconsistencies. To validate the latent variable Trust, we performed the scale's reliability test using Cronbach's alpha, which presented a value of .92, indicating a good internal consistency of the scale

(Hair Jr., Anderson, Tatham, & Black, 2009). Exploratory factor analysis was also carried out, confirming the unidimensionality of the construct (Table 2).

After performing the latent variable validation procedures, the items belonging to the variable were grouped, computing the average of their values as a way of measuring it. This procedure enabled us to test the hypotheses of the study, through the use of descriptive statistics, the analysis of variance (ANOVA), and the analysis of covariance (ANCOVA), using the general linear model through the statistical software SPSS for Windows 20.0.

Table 2. Validation of the scale used.

Trust	Loadings
This online firm is trustworthy	.88
I trust that this online firm keeps my best interests in mind	.80
This online firm will keep its promises	.90
I believe in the information that this online firm provides	.90
This online firm wants to be known as a company that keeps its promises and commitments	.87
Cronbach's alpha = .92	

ANCOVA allows the combination of nominal (categorical) and interval variables as predictors of the dependent variable. In addition, the use of covariates in the model helps reduce the error of the covariance matrix and, therefore, increase the accuracy of the model, adding uncontrolled variables in the experiment.

Thus, monthly family income and proximity to Facebook contacts were included as covariates in the model, since these attributes might influence the consumer's trust in a social commerce firm. For proximity, we used a question asking the participant to answer how connected he/she feels with most of his/her Facebook contacts, responding according to a scale ranging from (1) very distant to (5) very close. Other variables — experience with internet shopping, time spent on Facebook, and habit of using recommendations — were candidates to be covariates, but they did not meet to all statistical requirements. According to Hair Jr., Anderson, Tatham, and Black (2009), a covariate must show a certain relationship with the dependent variable (Trust) and must have a homogeneous regression effect, that is, similar effects for all groups – the designed scenarios. The test proposed by Field (2009) was carried out, with Trust being the dependent variable. Two customized models were processed via SPSS showing no significant relationship ($p < .05$) for the interactions

between scenario*income ($p = .11$) and scenario*proximity ($p = .52$).

ANCOVA was thus used to verify possible differences between the various scenarios under study, considering the general model and some variations in the characteristics of the offer (observing the product type and price practiced, allowing the analysis of five different models). In ANCOVA, the variable Trust was used as the dependent variable; the manipulated variables (Reviews, Peers, Product type, and Price compared to the competition) were inserted as independent variables, while Income and Proximity to Facebook peers were considered as covariates. In the following section, we present the results and discussion of the study.

RESULTS AND DISCUSSION

Initially, we analyzed the ANCOVA results without distinction of groups regarding the characteristics of the product and the offer price (general model) followed by some variations in the product type and price practiced in the offer (Table 3). This test revealed the impact of the independent variables, as well as the effects of the interaction between the studied factors on trust (dependent variable).

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Table 3. ANCOVA results.

Source	Product			Price	
	General (n = 590[a])	High monetary value (n = 293)	Low monetary value (n = 297)	Higher than the competition (n = 290)	Lower than the competition (n = 300)
Corrected Model	26.49***	27.03***	23.78***	21.83***	29.84***
Intercept	394.53***	182.65***	211.77***	136.87***	267.06***
Income	5.04*	8.07**	.14	.01	10.09**
Proximity	4.22*	3.82	1.01	2.50	2.43
Review	507.78***	271.45***	237.70***	221.57***	292.27***
Relationship	.26	.42	.01	.11	.19
Product	1.58	------------	------------	2.00	.20
Price	1.82	.20	2.73	------------	------------
Review × Relationship	9.06**	4.04*	4.29*	2.82	7.47**
Review × Product	2.03	------------	------------	4.13*	.05
Review × Price	.01	1.39	1.60	------------	------------
Relationship × Product	.22	------------	------------	.01	.39
Relationship × Price	.01	.08	.04	------------	------------
Product × Price	.61	------------	------------	------------	------------
Review × Relationship × Product	.01	------------	------------	.01	.17
Review × Relationship × Price	.31	.63	.06	------------	------------
Review × Product × Price	2.75	------------	------------	------------	------------
Relationship × Product × Price	.13	------------	------------	------------	------------
Review × Relationship × Product × Price	.11	------------	------------	------------	------------
R²	.50	.51	.48	.46	.53

Note. Column 1 presents the model's variables and their interactions; column 2 presents the ANCOVA results considering all valid cases (general model), followed by the study subsamples (product and price characteristics). $p > .05$ = N.S. (no significant coefficients); $p < .05$ = *; $p < .01$ = **; $p < .001$ = ***. Dependent variable: Trust; Covariates: Income and Proximity to Network contacts. [a]12 cases were excluded from ANCOVA for not having answered one of the two questions used as covariates.

ANCOVA indicated that both covariates – income ($F_{(1.568)} = 5.04$, $p < .05$) and proximity ($F_{(1.568)} = 4.22$, $p < .05$) – are significantly related to consumer trust in the online store and that there were also significant effects of the reviews on trust after controlling the effects of these covariates. As expected, it was identified that positive reviews have a strong positive effect on consumers' trust, while negative reviews cause the opposite effect ($F_{(1.568)} = 507.78$; $p < .000$), confirming H1. As shown in Figure 1, the mean of trust is 2.02 (± .77) when negative reviews are given by consumers, while for positive ones this average increases to 3.59 (± .77).

We performed a two-way ANOVA, comparing both conditions to the average of cases without reviews (mean = 3.03 ± .67) and finding statistically significant differences (p < .000). This result corroborates findings from other studies, such as those by Zhang, Ye, Law, and Li (2010) and Hajli et al. (2013), demonstrating that positive reviews given by consumers increase trust in the website, while negative ones

discourage them to trust in the website. Zhang et al. (2010), for example, found that positive reviews from consumers significantly increased a restaurant's online popularity, while negative reviews from publishers had the opposite effect on the intention to visit the restaurant's webpage. We also noted that negative reviews have a much greater effect on trust (reduced by 33%) than that of positive ones (which increases by 18%).

ANCOVA also indicated a significant interaction effect between online reviews and the relationship between the consumer and the reviewers ($F_{(1.568)} = 9.06$, $p < .000$), confirming hypothesis H2 in the general model. This shows significant differences when the reviews on the website are made by friends (acquaintances), characterized here as members of the respondent's network of contacts on Facebook. Examining Figure 2, it is clearly observed that the peer relationship in the network moderates the effects of the online reviews on consumer's trust.
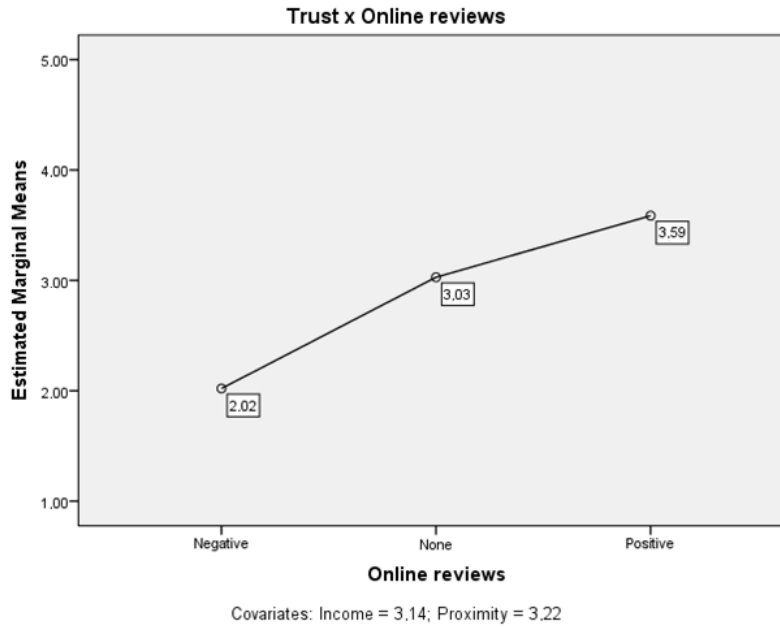
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Figure 1. Relation between online reviews and consumer trust in social commerce.

Reviews of friends enhance the main effect, either to positive recommendations (increasing the trust average from 3.46 to 3.71) and negative recommendations (reducing the trust average from 2.11 to 1.93). According to Hajli (2015), in the contemporary business environment in which people's social interactions on the internet shape new forms of interconnectivity, trust in online firms is influenced by people's social relationships and the platforms on which they interact. Dong, Li, and Sivakumar (2019) reinforce that trust in an online company involves the consumer's trust on reviews, which is influenced by the perception of reliability in the reviewer's opinion. Thus, the proximity of the reviewer to the consumer, for example, pertaining to his/her network of contacts, increases the confidence in the reviews or comments that will affect the company's trust.
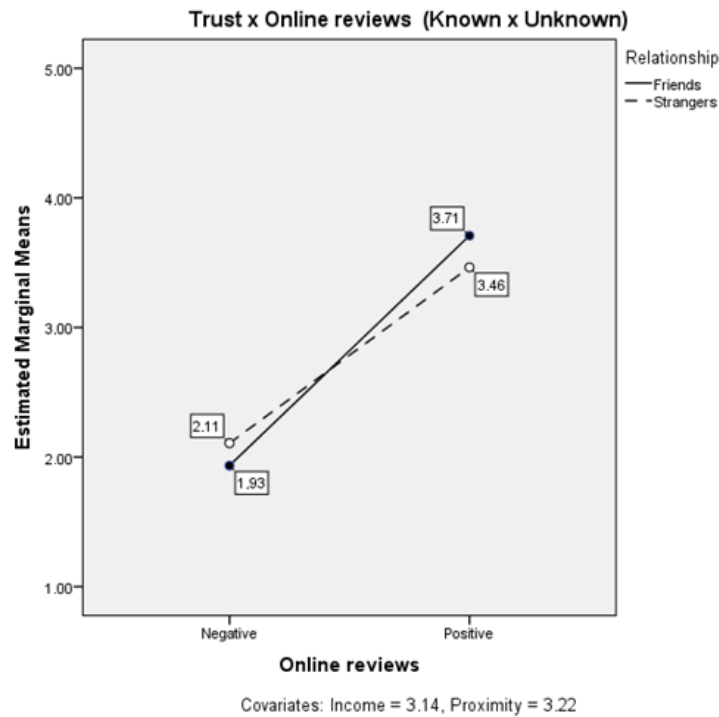

Figure 2. Effect of the interaction between online reviews and peer relationships.

Following, we analyzed the relationship between online reviews and consumer trust, considering different types of offers: Product — high-value or low-value, and Price — more expensive than the competition or cheaper than the competition (Table 3). Analyzing the specific scenario of the high-value product (TV set), ANCOVA indicated a significant main effect of online reviews on trust ($F_{(1.281)} = 271.45$, $p < .000$) as well as a significant interaction effect between online reviews and peer relationship ($F_{(1.281)} = 4.04$, $p < .05$) on consumer's trust, thus reinforcing the confirmation of hypotheses H1 and H2 for this scenario. Maia et al. (2018) suggested that the use of online reviews for more expensive products (such as computers and electronics) is higher than for low value products (such as household appliances, health and beauty, books, airline tickets, fashion, and domestic utilities), which corroborates our results.

Additionally, the type of online review and the fact that it is given by people within the participants' circle of friends influence significantly consumer's trust in the online store. As shown in Figure 3a, we can see that peer relationship in the network moderates the influence of the online reviews on consumer's trust in this type of situation (high-value products). Reviews made by friends (acquaintances) enlarge the effect of the recommendations, both when they are positive (increasing the average trust from 3.55 to 3.82, when these online reviews come from people in the consumer's circle of friends) and similarly when they are negative (decreasing the average trust from 2.09 to 1.95, when they come from social network peers). Unlike the general model, only the covariate income was significant ($F_{(1.281)} = 8.07$, $p < 0.05$), since proximity was not significant at the 5% level ($p = .52$), suggesting that the degree of proximity of the participant to the contacts of the social network does not influence his/her trust for high value goods, being sufficient to be present as a contact in the social network to influence the consumer's trust.
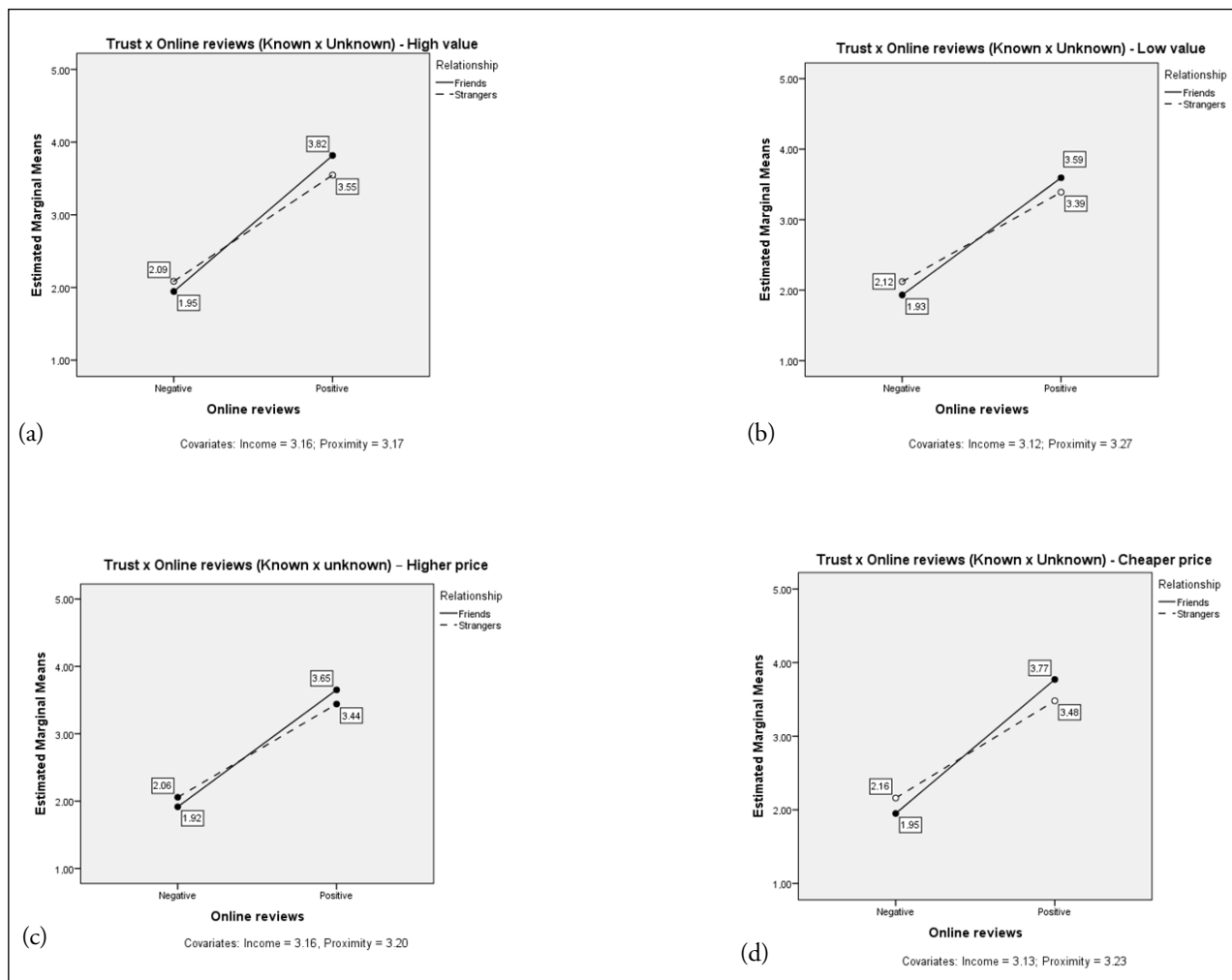

Figure 3. Effect of the interaction between online reviews and peer relationships.

Regarding the scenario offering the low-value product (USB flash drive), ANCOVA indicated a significant main impact of online reviews on trust ($F_{(1.285)}$ = 237.70, $p < .000$) as well as a significant interaction effect between online reviews and the presence of peers ($F_{(1.285)}$ = 4.29, $p < .05$) in consumers' trust, also confirming hypotheses H1 and H2 for this scenario. Similar to what happens in the situation of high-value products, the comments, ratings, and recommendations made by friends (acquaintances) strengthen the effect on trust, as illustrated in Figure 3b. The mean of consumer's trust increases from 3.39 to 3.59 when positive reviews are made by friends and lowers from 2.12 to 1.93 when negative reviews of friends appear. It is noted that both covariates were not significant ($p = .71$ for income, and $p = .32$ for proximity), indicating that they do not interfere with the consumer's trust in situations with offers of low value products. Comparing with the previously presented results, it is worth noting that only in cases involving low-value products (such as the USB flash drive) the monthly family income and the proximity to Facebook contacts do not interfere with the effects on trust, which can be explained by the fact that for low-value products the buyer accepts more easily a higher financial risk tolerance, since the transaction cost will be lower, not compromising his/her income so much.

Researching the effects of online reviews on Saudi citizens' online purchasing decision-making process, Almana and Mirza (2013) also found that the impact of online reviews on the purchasing decision is greater for expensive goods. Additionally, they revealed that the impact of negative online reviews on purchasing decision is a bit greater than the impact of the positive ones. When making purchasing decisions of expensive goods, 50.7% of the respondents agreed that negative reviews were important influencers, above the 44.7% found for positive comments. In Brazil, we found similar results. The variation of trust — caused by negative or positive reviews — is greater for high-value products such as a TV set. For this class of product, trust ranged from 1.87 (3.82–1.95), in which comments were done by friends, and 1.46 (3.55–2.09), in situations where comments were done by strangers (Figure 3a). These values for trust are higher than those found in the scenario involving the low value product (Figure 3b), 1.66 (3.59–1.93) for friends and 1.27 (3.39–2.12) for strangers. We see that in both situations (friends vs. strangers) the difference regarding the trust variation is higher in cases involving high value products.

Analyzing those cases where the price of products is higher than the competition, ANCOVA revealed a significant main impact of online reviews ($F_{(1.278)}$ = 221.57, $p < .000$) and a significant interaction effect between online reviews and the product ($F_{(1.278)}$ = 4.13, $p < .05$) in consumer's trust. In this scenario, the type of online review (positive or negative) significantly influences the consumer's trust in the company, especially if there are positive comments about the online store (Figure 4).
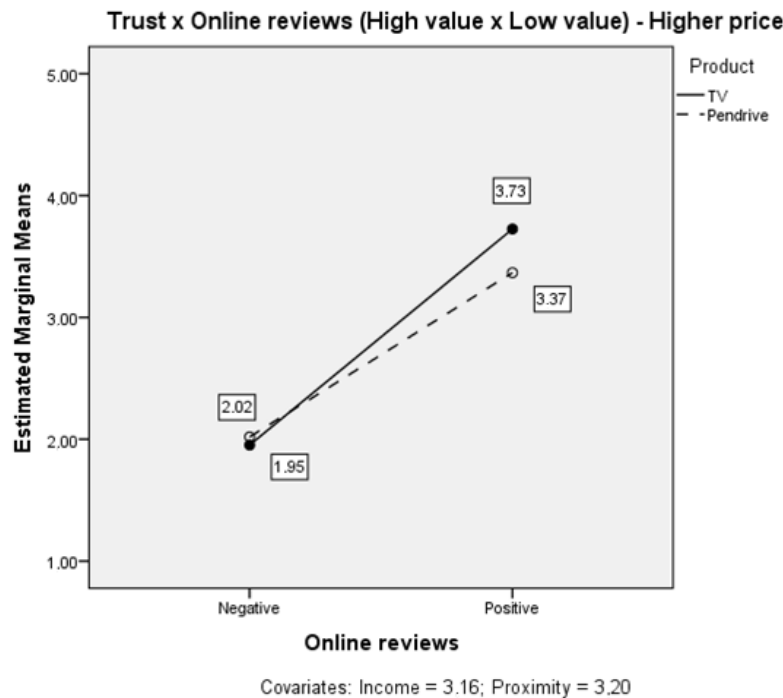

Figure 4. Effect of the interaction between online reviews and product — higher price than the competition.

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This happens regardless of whether the product is of high or low value, unlike the cases involving offers with prices lower than the competition in which the product does not have any interaction effect — which will be better explained further. For products whose offer prices are higher than the competition, when there are positive recommendations, consumer trust is higher than the situations when reviews are negative, in both cases, for high-value (M = 3.73 and 1.95) as well as for low-value (3.37 and 2.02) products. Lee and Hong (2019) affirm that the consumer's trust in specific reviewers and the utility of the review contribute to its adoption. Looking to our results concerning the higher-price-than-the-competition scenario, we found that online reviews are more useful when they are positive and associated with high-value products (such as the TV set). In this scenario, trust remained practically the same with negative reviews, but its variation was stronger when analyzing the high-value product (Figure 4). Thus, observing the interaction effect between the product and the online reviews on trust, the type of the product moderates the main effect of the influence of the recommendations on consumer's trust, confirming hypotheses H1 and H3 for this scenario, in which the price of products is higher than the competition.

This result shows that positive reviews made in offers of high-value products and with a price higher than the competition affect most the trust of the consumers on the online store. For products with higher values (like a TV set), the consumer's trust on the firm must be higher to compensate the risk of making the purchase, which leads the consumer to value the reviews of third parties even more — whether they are strangers or not — since the transaction cost will be higher. Similar to the model for low-value products, the covariates income (p = .96) and proximity (p= .12) were not significant. It is still worth noting that for this scenario (Figure 3c), the interaction between reviews and peers is not significantly (p = .09) related to trust, not confirming hypothesis H2 for this scenario.

Finally, when analyzing the cases where the price of the products is lower than the competition, ANCOVA once again revealed a significant main impact of online reviews on trust ($F_{(1.288)}$ = 267.06, p < .000) as well as a significant interaction effect between online reviews and peers ($F_{(1.288)}$ = 7.47, p < .05) on consumer's trust, also reinforcing hypotheses H1 and H2 for this scenario. In this situation, the type of online review (positive or negative) and the fact that the comment is given by people within to the consumers' circle of friends influence the consumer's trust in the online company (Figure 3d).

Thus, the peer relationship in the network acts as a moderating variable in the relationship between online reviews and trust. Positive recommendations have a significant impact on the average of trust, increasing from 3.48 to 3.77, when these come from people in the consumer's circle of friends. In the case of negative recommendations, the opposite occurs (decreasing from 2.16 to 1.95) when these comments come from acquaintances. Thus, it can be concluded that in cases of purchase involving products whose prices are cheaper than the competition, the relationship between the consumer and the reviewer has a moderating effect in which online comments and ratings made by friends will increase or decrease more intensively the consumer's trust on the online store, in an attempt to reduce a likely feeling of perceived distrust. In this scenario, only the covariate income was shown to be significantly related to trust (p < .01). Hence, how connected (or close) the consumer feels to his/her contacts does not interfere significantly in the direct relationship with Trust (p = .12) as well as the interaction ones.

The analyses considering the characteristics of the offer — product and price — based on the distribution of the cases into subsamples partially confirmed hypotheses H2 and H3, and rejected hypothesis H4, both in the general model and its derivations. Figure 5 presents the research model resulting from the study.
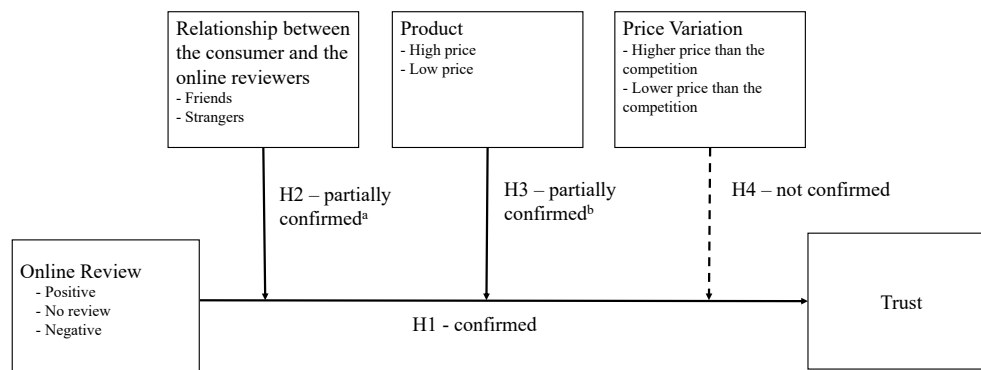
a – Confirmed hypothesis in the general model;
It is not confirmed for a price more expensive than the competition.
b – Confirmed hypothesis in the model with higher price than the competition.

Figure 5. Conceptual model resulting from the research.

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The analysis considering hypothesis H1 (positive online reviews will generate more trust than a lack of reviews, while negative reviews will have the opposite effect) was confirmed in all investigated scenarios. With regard to the separation of product characteristics and prices in relation to competition, from the separation of cases into subsamples, hypothesis H2 (the social relationship between the consumer and the online reviewers — social network peers or not — will act as a moderating variable in the relationship between online reviews and consumer's trust) was confirmed in practically all cases, except when prices are higher than the competition ($p = .09$) — the third analyzed scenario. In this situation, hypothesis H3 (the type of product — high or low value — will act as a moderating variable in the relationship between online reviews and trust) was confirmed. Finally, hypothesis H4 (the product price in relation to the competition — more expensive or cheaper — will act as a moderating variable in the relation between online reviews and trust) was rejected in all cases.

It is also worth noting that ANCOVA showed the absence of interaction relations between more than one moderating variable simultaneously (referred to as moderated moderation, according to Jaccard & Jacoby, 2010), where none of the possible interactions (Reviews ˣ Relationship ˣ Product, Reviews ˣ Relationship ˣ Price, Reviews ˣ Product ˣ Price, Relationship ˣ Product ˣ Price, Reviews ˣ Relationship ˣ Product ˣ Price) proved to be significant ($p > .05$). Briefly, we concluded in our study that online reviews on consumer trust are the only relationship presenting a direct effect in all scenarios. Additionally, in the general model and specially in offers with prices below the competition, the source of the review (friends or strangers) moderates the relationship between online reviews and consumer trust; on the other hand, in offers in which prices are higher than the competition, the product type (high or low value) moderates this relationship.

FINAL REMARKS

Determining attributes and factors that influence the success of social commerce has become a frequent target of studies, since more and more people are inserted in the social media context as a form of interaction, exchange of information, collaboration, and, of course, commerce. However, research is still needed to reveal certain patterns of consumer behavior, demonstrate complex relationships among variables, and create new knowledge on the e-commerce topic.

The present study attempted to fill this gap by investigating the interaction effects between online reviews and some product characteristics on consumer's trust. We

investigated a couple of relationships and conditions that have not been well addressed yet by the literature. We believe that identifying important factors that can produce effects on consumer's trust in the online store, such as the findings of this research, can be used by companies in order to improve their interaction strategy with their target audience, increasing sales and improving the quality of their services. Online stores, for example, could benefit more by promoting positive reviews systematically (e.g., highlighting good comments and reviews in noticeable positions on the online store), stimulating their consumers to share reviews on different platform sites, and also working together with social network providers to cross-reference the reviews posted.

Suggestions for future research are strongly related to the limitations of this study. The research was developed in an artificial environment of s-commerce using a single website, in which the opinion of the participants was made for only two products, being, therefore, interesting to replicate the research using different items with other characteristics or considering the analysis and inclusion of other variables more associated to the consumer purchase goals (a personal need, for example) or even the consumer characteristics (such as gender or age). A field experiment could be a good alternative for this. In addition, future research could deepen the investigation of the unconfirmed hypothesis, considering other scenarios such as using prices that are more disparate than the competition (such as Premium or on-sale products) or controlling more accurately the degree of relationship between the reviewer and the consumer, if relative, friend, just an acquaintance, or a stranger.

We expect that our findings and suggestions for future studies can contribute to the development of this research field. Nevertheless, we believe that this study can help managers and website developers create more appropriate processes and strategic alternatives to this new business environment, based on a better understanding of the relationships among the variables studied in this research. Indeed, we observed that online reviews represent a contemporary and relevant key aspect to the online store's development whereas s-commerce became one of the latest means for individuals and companies to act and interact in the modern world. As proposed by Bilal, Akram, Rasool, Yang, and Tanveer (2021), s-commerce is not the cherry on the cake, but the new cake! Therefore, companies should pay attention to the management of the third-party reviews such as comments, recommendations, and references especially if these reviews come from the consumer social network peers, considering our findings about the different aspects related to the offer including the characteristics of the product and price.

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Authors' Contributions

1st author: conceptualization (lead); data curation (lead); formal analysis (equal); investigation (lead); methodology (equal); validation (equal); writing – original draft (equal).

2nd author: data curation (equal); formal analysis (equal); investigation (supporting); methodology (equal); project administration (equal); supervision (equal); validation (equal); writing – original draft (equal); writing – review & editing (equal).

3rd author: data curation (equal); formal analysis (equal); investigation (equal); validation (equal); writing – original draft (equal); writing – review & editing (equal).

## Peer Review Method

This content was evaluated using the double-blind peer review process. The disclosure of the reviewers' information on the first page, as well as the Peer Review Report, is made only after concluding the evaluation process, and with the voluntary consent of the respective reviewers and authors.

Data Availability

The authors claim that all data used in the research have been made publicly available through the Harvard Dataverse platform and can be accessed at:
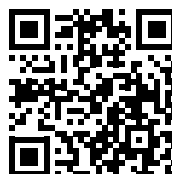
Soares, Muriel Araujo; Dolci, Décio Bittencourt; Lunardi, Guilherme Lerch, 2022, "Replication Data for "Interaction effects between online reviews and product characteristics on consumer's trust" published by RAC - Revista de Administração Contemporânea", Harvard Dataverse, V1. https://doi.org/10.7910/DVN/BDP0R6

RAC encourages data sharing but, in compliance with ethical principles, it does not demand the disclosure of any means of identifying research subjects, preserving the privacy of research subjects. The practice of open data is to enable the reproducibility of results, and to ensure the unrestricted transparency of the results of the published research, without requiring the identity of research subjects.

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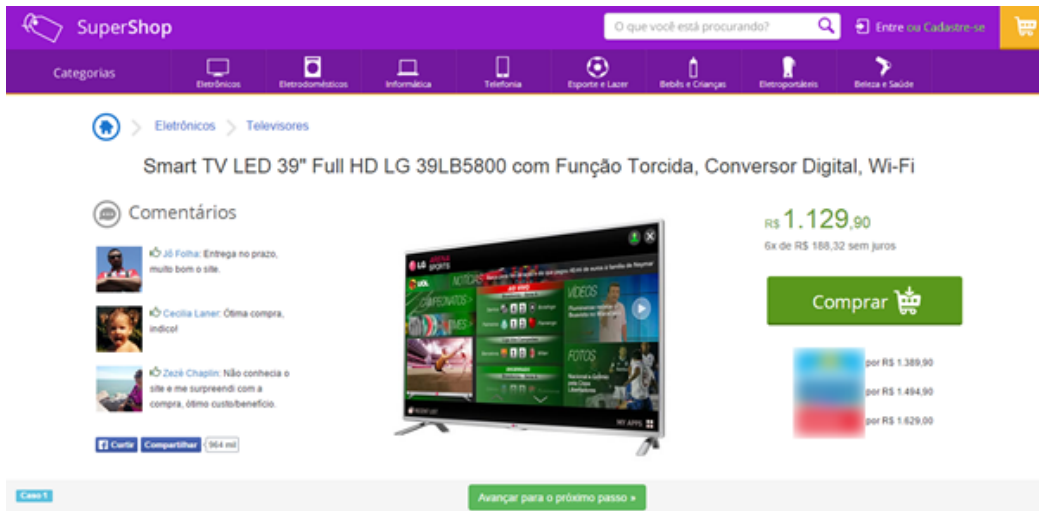
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APPENDIX A

Figure A1. Example of one of the scenarios built for the online shopping site used in the research.

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