I Can't Believe Online: A Study on How Negative Reviews Move Online Shoppers to the Offline Channel

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Abstract

Despite the benefits of online shopping, we easily observe consumer behaviour when making purchases through offline channels. Why do they choose to go offline by taking the effort to go there? As a factor influencing decision-making, this study assumes that distrust of online shopping increases webrooming intentions that online consumers move to offline channels. Consumers check online reviews as well as seller information to increase their purchasing confidence. There are few studies on the effect of negative online reviews on consumers' purchasing decisions. Contrary to the pessimistic results of previous studies, the results of this study explain the mechanism by which consumers who saw negative online reviews feel distrust of online shopping and go to offline stores. It provides implications for understanding the migration phenomenon of online shoppers to offline channels and what strategies should be prepared to retain and attract customers to each channel.

Keywords: Webrooming, Need for touch, Online review

1. Introduction

These days, consumers can make purchase decisions utilizing diverse channels. Due to the advancement of digital technology, consumers can now meet products through various touchpoints, switching easily across multiple channels (Baxendale, Macdonald, and Wilson 2015). These phenomena customers' smart shopping (Lee and Ma 2012; Chae, Lim, and Kang 2015; Flavian, Gurrea, and Orús 2019). As smart shopper has increased, allowing consumers to become research shoppers, gaining confidence to purchase (Verhoef, Neslin, and Vroomen 2007). To gain much information, consumers may visit not online but offline store. Based on individual preferences, some consumers browse websites to see the online review before purchasing offline, referred to as webrooming (Sevitt and Samuel 2013).

Online markets allow consumers to not purchase products but share their opinions online freely. User-generated content acts as an important information source for other consumers' future purchases. According to an Ambrine Trend Monitor survey (2017), approximately 79% of the respondents always check the purchase reviews prior to purchasing a product online. Banerjee and Chau (2004) posit that, when consumers purchase goods online, they have more than not validated their purchasing decision using online reviews. Online retailers recognize that such reviews influence purchase decisions and allow potential buyers to evaluate products (Jabr and Zheng 2014). Despite the prevalence of multi-channel shopping behaviours, few studies consider online reviews, which are the main characteristics of online shopping. According to a previous study, Consumers increase their level of confidence regarding their purchases when encountering only positive reviews (Flavian, Gurrea, and Orús 2019; Neslin et al. 2006). Conversely, consumers avoid online shopping purchases if they are uncertain or perceive that there exists a risk in online shopping.

There is no research on the effects of negative online reviews although there are some findings that indicate that uncertainty related to online shopping channels leads to webrooming. We aim to investigate how consumers are affected by negative online reviews. Though negative reviews may decrease purchase intentions overall (Tybout, Calder, and Sternthal 1981; Wyatt and Badger 1984), this is more common for intangible products since consumers are unable to obtain tactile information elsewhere. Experience products are highly susceptible to this effect as it is difficult to evaluate quality before purchase; negative movie reviews tend to decrease box office receipts (Basuroy, Chatterjee, and Ravid 2003). The quality of the reviews is rather subjective and other studies highlight that there exist many low-quality online reviews such as product misinformation, brief descriptions, and lack of support (Korfiatis, García-Bariocanal, and Sánchez-Alonso 2012). Some buyers tend to buy with confidence when exposed to positive reviews, while others feel uncertain about their online purchases when reading negative ones. Neslin et al. (2006) posit that suspicious consumers need to gather more information to alleviate their uncertainty. Hence, the research questions explored in this paper are as follows: Do negative reviews affect consumers' distrust of online shopping leading to webrooming?

In some respect, there is a concern that consumers do free-riding behaviour - consumers perform multi-channel research and consequently choose to buy at the store that offers the best experience or price (Heitz-Spahn and Sandrine 2013; Jing 2018). It raises the question of whether offline stores bear the research costs while foregoing profits despite the time and money invested in the brick-and-mortar location (e.g., maintenance costs and salaries). In addition, it means intensifying competition between online channels and offline channels, and it means that costs are incurred in channels where consumers have only browsed without purchasing while moving between channels. As consumers' channel-switching behaviours persist, it is important to understand their intentions and decision journeys.

2. Literature review

2.1. Webrooming

Webrooming is one of the activities of multi-channel navigation before a consumer makes a final purchase. When a purchase is made online, there is online shopping in which a purchase is made directly online, and showrooming, in which the actual purchase is made online after searching for product information using both an offline store and an online website. When purchasing is made offline, there are offline shopping, in which the product is viewed in an offline store and then purchased directly in the offline store, and webrooming, in which the actual purchase is made in an offline store after looking at the product in both the offline store and online website (see Table 1). Webrooming has rapidly become the new smart shopping approach, leading to the deep research about the consumer decision journey (CDJ). It is one of many complex purchasing patterns utilizing multi-channel research (Heitz-Spahn and Sandrine 2013). According to Sevitt and Samuel (2013), 26% of Pinterest users in the United Kingdom (UK) regularly engage in showrooming, while 41% tend to engage in webrooming. Though there is a general understanding of showrooming behaviour, the question remains as to why consumers engage in webrooming that is less convenient. Flavián et al. (2019) conducted an experiment about satisfaction with multi-channels, being statistically significant webrooming intention for the experience-based product. Therefore, we have decided to include an NFT consideration in our experiment to further expand on these findings.

Prior studies tend to divide this purchase journey into two stages: (1) an information search stage and (2) a purchase stage (Verhoef, Neslin, and Vroomen 2007; Kim and Park 2007; Choi and Yang 2016). In the first stage, satisfaction with the search is an important factor affecting the consumer's shopping experience. When this search process is unsatisfactory, it leads to a level of distrust of online shopping, which in turn leads to webrooming (Lemon and Verhoef 2016; Flavian, Gurrea, and Orús 2016; Choi and Yang 2016). Therefore, the information search stage impacts the purchase stage behaviour.

Kim and Park (2007) analyzed 10 factors related to consumer and product characteristics to understand how the online and offline channel selection during the research stage affects the purchasing process. Furthermore, they discussed the research-shopper phenomenon, whereby consumers utilize different channels during their research phase, however, it does not present a practical purchasing process. The authors found that only 27% of the respondents utilized single channel in searching while 73% searched used multiple channels (Verhoef et. al. 2007).

According to Choi and Yang (2016), multi-channel behaviors can be grouped into four types, as shown in Table 1.

Table 1. Consumers' shopping behaviours based on channel usage.

	Offline purchase	Online purchase
Single channel search	Offline Shopping	Online Shopping
Multi-channel search	Webrooming	Showrooming

In this study, the scope of the concept for webrooming is set as follows: In the case of purchases considering webrooming from the beginning, as well as the intention to move from online to offline stores after seeing negative reviews online, and to make actual payments through offline channels.

2.2. Trust and distrust for online reviews

An online review refers to the online evaluation of experiences with purchase (Mudambi and Schuff 2010). There is a high tendency for consumers to see online reviews (Li et al. 2013; Kumar and Benbasat 2006) before making a purchase.

Swan and Nolan (1985) define trust as a person's subjective evaluation that may distort a particular transaction. Trust plays a meaningful role in alleviating online shopping uncertainty and in overcoming incomplete product information. Online reviews can reduce the uncertainty surrounding the online shopping experience (Featherman and Pavlou 2003).

There are several factors that prevent users from trusting online channels such as the perceived risk of online shopping. A study by Pappas (2016) discovered that the risks related to product quality in online channels affect consumer product trust and the risks related to online sellers and online channel security affect consumer online channel trust. The various perceived risks of online lead consumers to channel switching behaviours (Lee 2009). So, online marketing strategy should focus on minimizing the risks associated with products and web vendors (Chikweche and Fletcher 2010).

Prior studies have established that reliable online reviews have a great influence on consumers' purchasing and repurchasing intentions by lowering the perceived risk (Liu and Park 2015). Ba and Pavlou (2002) studied the impact of online reviews on online trading and trust in product quality, showing that the level of trust lessens information asymmetry by reducing the risk of each transaction. Walden (2000) posited that seller review services build trust in online shopping. There is a negative correlation between trust and perceived risk of online shopping; the distrust could be realized in a market have been leading to the failure of the online market (Granovetter 1985).

2.3. Negative online reviews: focusing on the risks of online shopping

Most online review systems have served both positive and negative reviews to online users. In the case of Coupang, a Korean e-commerce company like Amazon.com, users can see the positive and negative reviews in the form of a star ratings. However, many online review experiments are conducted excluding negative reviews (Flavian, Gurrea, and Orús 2016). According to Sundaram, Mitra and Webster (1998), negative messages have a detrimental effect on unfamiliar brands. Pavlou (2002) highlights the importance and necessity of studying negative reviews to reveal that negative reviews have more impact on trust than positive ones. Similarly, Lee, Park and Han (2008), who studied the negative reviews from the viewpoint of information processing, argued that negative information is more important and more weighted in content messages. Although there are not many studies on negative electronic word-of-mouth, some findings suggest that negative reviews have a more powerful influence than positive reviews (Hao et al. 2010). Despite the importance of research on negative online reviews, existing research on webrooming deals with an only positive review (Flavian, Gurrea, and Orús 2016).

We try to imagine the process of online users feeling online risk and then going to offline channels. The perceived risk is in all purchasing decisions, especially when the outcome is uncertain (Dholakia 2001). Based on the Uncertainty Reduction Theory (URT) that online consumers visit offline stores to experience products and then decide to purchase. In URT theory, when strangers meet, their main concern is to reduce uncertainty (Lee and Turban 2001). There have been studies that reduce risk factors when they give the opposite benefit to perceived risk (Bhatnagar and Ghose 2004). Thus, this study assumes the premise that consumers who see negative reviews and feel distrust of online shopping can think of offline experiences as heuristic and switch channels.

Also, based on the Uncertainty Reduction Theory (URT) that online consumers visit offline stores to experience products and then decide to purchase, we assumed the process of online users feeling online risk and then visiting offline channels.

H1. Negative online reviews affect the distrust of online shopping(H1a) and intention of webrooming(H1b).

2.4. Type of online reviews: focusing on the representation of online risk

Although text mining can analyze which content is in online reviews, there are not many studies that have grasped consumers' reviews and purchase intentions based on the content of online reviews. To fill this gap, this study attempts to understand consumers' intentions based on the content of online reviews. We divided the types of online reviews into 2 representing the risks of online shopping.

Furthermore, many previous studies followed the belief that consumers read the online reviews to check on the product quality before the purchase (Kim et al. 2007). Kim (2021) proposed the estimation model by using aggregate-level, longitudinal data from Amazon.com to prove the impact of consumer reviews on the market outcome. He applied the choice-based aggregate demand model in the context of consumer reviews, which is assumption that the consumers tend to gain the important information via review.

As mentioned earlier, Choi and Yang (2016) researched a multi-channel by dividing the search and purchase phases to discover the webrooming intentions. It is conducted to influence the distrust of online shopping by the perceived online risk. Also, Forsythe and shi (2003) studied the perceived risk of online search is derived from the risk of product search and specify that it is difficult to judge the quality of a product on online channel. The perceived risk of the product means that the product cannot be experienced directly, so the product cannot be fully evaluated until the product is immediately received. The higher risks, the more reluctant to buy online (Mitchell 1999; Featherman and Pavlou 2003).

As other risk factors, waiting for product delivery is perceived by consumers (Masoud and Emad 2013). The perceived delivery risk results from the uncertainty about receiving the product after prepayment online. The perceived risk is in all purchasing decisions, especially when the outcome is uncertain (Dholakia 2001). It is important to know that consumers are aware of the risk even if they substitute, delay, or cancel a purchase.

Based on this, it is assumed that consumers can have webrooming intentions according to product and delivery information and these negative reviews give consumers into two stages, setting online reviews into two types: Product-descriptive reviews and Delivery ones.

According to a study by Pappas (2016), consumers perceive website risk to be higher than the product risk, having a more pronounced impact on trust in online shopping. Online shopping will make you feel more uncertain about delivery, even though the purchase on offline channel can avoid the risk of delivery. It is assumed that both types of reviews have a negative effect on consumer trust in online shopping channels. Therefore, we examine the effects of these two factors on the distrust of online shopping. Particularly, online reviews containing shipping information will have more impact.

H2a. *Negative delivery reviews affect the distrust of online shopping more than negative product reviews.*

H2b. *Negative delivery reviews affect the webrooming intention more than negative product reviews.*

2.5. Quality of online reviews

From a cognitive point of view, consumers perceive reviews to be more useful when they contain well-supported claims and evidence rather than when they are extremely positive or negative, by using appropriate information filtering when accessing online reviews (Jiang and Srinivasan 2011). Recent studies consider the length, depth, and specific frequency of reviews, but there is a lack of information on the context and sentence persuasion. According to Racherla, Mandviwalla, and Connolly (2012), consumers trust high-argument quality reviews. It has been suggested that online retailers should consider the review quality. By Lee, Park, and Han (2008), the quality of online consumer reviews was evaluated through a series of factors such as understandability, reliability, relevance to purchase decision, and sufficiency of reasons for the opinions.

A study by Schindler and Bickart (2012) defined a high-quality review as being product-related and containing an explanation and a low-quality review as being the product-independent, indigestible, and insufficient explanation.

Pavlou (2002) suggests that negative reviews may have a stronger impact on trust than positive ones, providing an impetus to study the quality of negative reviews. Hence, we set the quality of the online reviews as a moderator variable and test its effects. As our aim is to investigate whether consumers are leaving online for offline shopping channels, we want to find out what effect low-quality negative reviews have on this consumer behaviour. In this context, when the quality of online reviews is low, it

is assumed that the negative reviews impact the perception of the website (Lee and Shin 2014), and that product reviews of lower quality increase the uncertainty associated with online shopping:

H3. Low-quality reviews influence on the distrust of online shopping(H3a) and intention of webrooming(H3b).

In this study, negative online reviews were divided according to type and quality. Unlike in-store purchases where you can receive products offline first, the low quality of online delivery information will make consumers more unbelievable. Therefore, we intend to establish a hypothesis that the interaction of the two variables will affect the distrust of online shopping and the intention of webrooming.

H4a. Low-quality reviews increase the impact of negative product reviews on the distrust of online shopping.

H4b. Low-quality reviews increase the impact of negative delivery reviews on the distrust of online shopping.

2.6. Need for touch and distrust of online shopping

Research has shown that the type of product being evaluated online also affects the level of distrust of online shopping (DOS). Peck and Childers (2003) devised the NFT scale utilizing two factors (the instrumental factor and the autotelic factor), which are used to define the category of items. According to Flavián, Gurrea, and Orús (2016), the desire to touch the product in question leads consumers to switch from online to offline channels (i.e., webrooming). Therefore, we investigate whether need for touch impacts a consumer's intention to switch to webrooming:

H5. The higher Need for Touch (NFT) increase the impact of negative reviews on the webrooming intention.

We evaluate independently whether the quality of negative reviews directly affects webrooming intentions through a mediator effect. In previous studies, there have been many variables considered leading to webrooming intentions, and we deem it necessary to confirm whether the quality of online reviews directly affects product attitudes:

H6a. For high NFT products, lower quality product reviews impact webrooming intentions.

H6b. For low NFT products, lower quality delivery reviews impact webrooming intentions.

3. Methodology

Figure 1 shows the research model showing all the hypotheses. In the context of webrooming, consumers search for product information but visit offline channels to get the feel and touch of the actual product, confirm the fit of clothes or shoes, and gain tactile information during the purchase stage. Peck and Childers (2003), using the NFT scale, revealed that the haptic system is important to consumers. Therefore, we utilize the NFT as a moderator variable on webrooming intentions, considering the type of product.

We aim to clarify webrooming intentions as related to different levels of review quality. To analyze the online consumer decision journey, we used actual reviews as a survey tool to secure validity. Specifically, we collected actual reviews from the 'Coupang.com' website as empirical data to identify the role of review quality on webrooming intentions. We analyzed the frequency of specific text to set up our survey tool and controlled the quality of reviews for the experiment using the
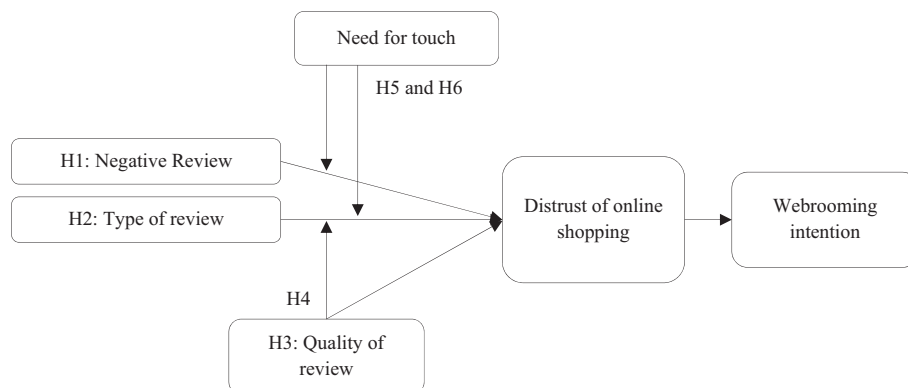

Fig. 1. Research model.

manipulation check and pre-test. We evaluated both positive and negative reviews.

3.1. Manipulation checks

Prior to administering the survey, we perform a manipulation check on products type and online reviews. Flavián, Gurrea, and Orús (2019) highlighted clothing and electronics as product type to point out the differences in search-experience properties, helping to explain how webrooming intentions changes. Six items (clothes, shoes, accessories, USB drives, and electronic devices such as mouse and keyboard) were checked by the need to touch six items from Peck and Childers (2003) NFT scale. 124 college students selected and secured 88 responses (55 males, 33 females). 50.4% of the respondents preferred showrooming, 4.5% − webrooming, 18% − offline channels only, and 56% − online channels only. We investigated product preferences and found that t-shirts and keyboards were most purchased online. Since consumers do not have a clear brand preference, these two items can easily control price and brand.

We crawled 1000 of each positive and negative reviews on Coupang.com validated in the pre-test (high NFT − t-shirt; low NFT − keyboard). The results are summarised in Table 2 below:

The multi-channel shopping was divided into two stages (search and purchase) to analyze how consumers use different channels in each stage. As part of the search process, we focused on the risks of product quality and delivery. Consumers use product reviews when they cannot experience the products (Mitchell 1999) and mitigate perceived risk (Grewal, Gotlieb, and Marmorstein 1994). In survey, online reviews were divided by the product- and delivery-related dimensions.

To explore how the quality of the reviews affects webrooming intentions, we cite the research method of Racherla, Mandviwalla, and Connolly (2012), who crawled actual reviews on websites and then set up a virtual review, which is evaluated the text of the review and the frequency of key phrases. There are four types of reviews that we covered in our questionnaire: positive and negative reviews of the two products resulting from the NFT test.

We attempted to simulate realistic shopping conditions. If consumers only see negative reviews, purchasing intention is significantly lowered. Park, Yi, and Kang (2019) revealed that attitude toward review is more favorable when the review is two-sided (both positive and negative) than one-sided (only positive). At least one positive review was adopted in the survey and distinguish between positive and negative reviews as star score: 5-star reviews are considered positive, and 1-star ones are negative. Toulmin (1958) identified three elements of argument quality: claim, data (information and data on the claim), and backing (the specifically persuasive sentence that can guarantee personal experience or trust in claims). High-quality reviews were evenly arranged above three elements, and a low-quality one only had a claim.

Based on the theory of planned behaviour (TPB), people do tend to buy products with negative reviews (Pavlou and Fygenson 2006). Therefore, we put together the actual positive reviews one by one because negative eWOM reduces purchase intentions. The setting-up quality of T-shirt reviews provides a sample of the virtual reviews. (t-value = 18.30 (335), p < .001***) (see Table 3).

We asked 77 respondents to categorize the reviews using a semantic differentiation scale: 'Which type of review is a given review closer to?' Clearly distinct temperaments for product- and delivery-

Table 2. Results of manipulation check 1: NFT.

Category	N	%	Need for Haptic information	Need for touch
Top	11	25.6	Fit	High (3.66)
Bottom	4	9.2	Fit	
Shoes	4	9.4	Fit	High (3.92)
Bag/belt	4	9.3	Touch and Fit	
Accessary	2	4.7	Touch	
Laptop/PC	3	7.0	Touch and Grip	Low (3.1)
Keyboard/Mouse	4	9.3	Touch and Grip	Low (2.86)
Hard drive/USB	6	14.0	Grip	Low (2.49)
Earphone/Speaker	5	11.6	Sound	Low (3.01)

Table 3. Analysis of the frequency of surveys by type of online review.

			Frequency	%	Adjusted_%
Product-descriptive review	APH	Delivery	1	1.5	1.5
		Product	66	98.5	98.5
	APL	Delivery	3	4.5	4.5
		Product	64	95.5	95.5
	ANH	Delivery	0	0	0
		Product	67	100	100
	ANL	Delivery	2	3.0	3.0
		Product	65	97.0	97.0
Delivery-descriptive review	BPH	Delivery	62	92.5	92.5
		Product	5	7.5	7.5
	BPL	Delivery	64	95.5	95.5
		Product	3	4.5	4.5
	BNH	Delivery	64	95.5	95.5
		Product	3	4.5	4.5
	BNL	Delivery	65	97	97
		Product	2	3	3

(Note: A = Product-descriptive review, B = Delivery-descriptive review, P= Positive, N= Negative, H= High quality, L = Low quality).

Table 4. Review quality paired t-test.

		Mean (SD)	t-value
Product-descriptive review	P*H	4.10 (.81)	38.16*
	P*L	2.96 (.99)	22.60*
	N*H	4.41 (.54)	61.64*
	N*L	3.81 (1.00)	28.70*
Delivery-descriptive review	P*H	3.89 (.82)	36.04*
	P*L	3.52 (1.10)	24.24*
	N*H	3.92 (.88)	33.54*
	N*L	2.71 (1.17)	17.48*

(Note: P, positive review; N, negative review; H, high quality; L, low quality *$p < .05$).

related reviews − which are settings for each type of online review − are found through the frequency analysis in Table 3 below. The frequency appears to be well-measured at 98.5% (see Table 5).

To discover the degree of quality, we cited Rains's augment quality factors (Rains and Stephen 2007) indicating which sentences have stronger persuasive contexts: compelling, well-supported, containing specific facts, detailed information, and providing concrete examples. We asked the respondents about these five factors using a 5-point Likert scale and examined the heterogeneity of the high- and low-quality review using two dimensions. The results support the properly reflected quality manipulation: M_high = 4.04, SD = .51 vs M_low = 3.30, SD = .76; t = 9.40, p < .05. The type of review was successfully manipulated: M_product = 3.81, SD = .58 vs M_Delivery = 3.53, SD = .66; t = 4.15, p < .01. Table 4 shows the combination of type and quality of all reviews.

In addition, the Euclidean distance analysis result, the high quality (.000−7.550) and low quality (.000−12.369) are well divided (see Table 5).

3.2. Experiment design

As there are two moderators in this study (NFT and quality of reviews), the design for experiment is

2 (type of review; between-subject) * 2 (quality of review; between-subject) * 2 (NFT; within-subject).

3.3. Sample

We conducted an online survey with 204 participants focusing on respondents who have experience with online purchases. Most of the respondents were in their twenties (83.3%), and they can be regarded as millennials who are very familiar with both the digital environment and mobile shopping. Our questionnaire confirmed that this generation is more active in multi-channel search than other age groups.

4. Results

To validate the survey results, we analyzed the principal components are summarised in Table 6. The commonality ratio is higher than .4 (or .5), the ratio of all factors is high, and Cronbach's alpha is .641. Model fit analysis for each model was conducted through variance analysis.

4.1. The effect of the independent variables

In H1, we investigated the effects of negative reviews on DOS and WI, respectively, through regression analysis. Also, we examined whether DOS has a mediating effect on the influence of

Table 6. Validation and reliability of variables.

	Factoring Analysis	KMO and Barlett	Cronbach's α
Type of Reviews	.640	.713 (.000***)	.684
Quality of Reviews	.759		
DOS	.580		
WI	.770		
A_High Quality	.844		
A_Low Quality	.762		
B_High Quality	.760		
B_Low Quality	.718		

Table 5. The result of Euclidean analysis about quality degree.

	Euclidean Distance									
	COM_High	SUP_AHigh	FACT_High	INFO_High	EXAM_High	COM_Low	SUP_Low	FACT_Low	INFO_Low	EXAM_Low
COM_High	.000	5.000	6.782	5.745	6.083	14.248	15.000	13.856	18.055	16.401
SUP_High	5.000	.000	6.083	4.690	6.164	14.142	14.967	14.526	17.861	16.492
FACT_High	6.782	6.083	.000	5.196	7.550	14.036	15.460	14.560	18.655	16.823
INFO_High	5.745	4.690	5.196	.000	6.000	14.071	15.033	14.248	17.916	16.613
EXAM_High	6.083	6.164	7.550	6.000	.000	15.033	15.297	15.264	19.000	17.146
COM_Low	14.248	14.142	14.036	14.071	15.033	.000	10.198	9.327	10.724	8.944
SUP_Low	15.000	14.967	15.460	15.033	15.297	10.198	.000	10.247	12.369	11.225
FACT_Low	13.856	14.526	14.560	14.248	15.264	9.327	10.247	.000	11.747	10.149
INFO_Low	18.055	17.861	18.655	17.916	19.000	10.724	12.369	11.747	.000	8.544
EXAM_Low	16.401	16.492	16.823	16.613	17.146	8.944	11.225	10.149	8.544	.000

(Note: COM=Compelling, SUP=Well-supported, FACT=Contained specific facts, INFO=Contained detailed information, EXAM = Concrete examples).

Table 7. Main effect (NR → WI).

	B	SD	β	t
(Constant)	1.611	.1848		8.298 (.000***)
Negative review	.446	.052	.553	8.547 (.000***)

(Note: N = 290. Robust regression coefficients are reported together with standard errors in parentheses. *p < .05, **p < .01, ***p < .001, significance levels are two-tailed).

negative reviews on WI through PROCESS (Hayes 2018).

As you can see in Table 7, the main effect of NR was verified, and hypothesis1a is supported (p < .001, = .306). In addition, it was verified that NR has a significant effect on DOS and that there is an effect of a variable through t-value (166) = 8.5467, p < .001 of Total effect of X on Y (Supporting H1b). This means that people can feel webrooming intentions from negative as well as positive reviews. As demonstrated by hypothesis 1a, it can be interpreted that distrust of online shopping induces motivation for webrooming intentions (see Table 8).

4.2. Quality of online reviews' effect

We asked 336 subjects about their online shopping patterns considering two different types of reviews. Each of the two types of reviews was randomly assigned to 168 respondents for testing H2. The results were examined through independent sampling tests and one-way analysis of variance (ANOVA) to determine which types of reviews influence the user's DOS and WI (F = 9.712, .002**).

Before the independent sample test, both types of reviews showed a significant level of normality using Kolmogorov–Smirnov and Shapiro–Wilk tests. The level of significance is successfully shown. In addition, Levene's equal variance test lists whether the variance of each group is the same. The significance probability value was greater than .05 and the significance level was .000.

It was confirmed that there was a difference between the average product and delivery reviews. Since variance analysis shows a significant level, both types of reviews affect distrust of online

Table 9. Regression analysis.

	B	SD	β	t
DV = DOS				
(Constant)	1.211	.088		1.877 (.046*)
Type of Review	.369	.079	.382	2.409 (.021*)
DV = WI				
(Constant)	2.921	.064		45.463 (.000***)
Type of Review	.283	.091	.168	3.116 (.002***)

(Note: N = 290. Robust regression coefficients are reported together with standard errors in parentheses. *p < .05, **p < .01, ***p < .001, significance levels are two-tailed.).

shopping, and the differences between reviews are also significant. Finding out which of the two types of reviews is more effective, the review was coded as a dummy variable whose *Delivery* is 1. As a result, the delivery-descriptive reviews have much effect on the DOS (t = 2.409*) and WI (t = 3.116***) through the regression analysis. H2a, b is supported (see Table 9).

This demonstrates that the results of previous studies on the delivery factor among the risks of online shopping can be confirmed through online reviews. Among the negative reviews, delivery information causes consumers to have greater distrust than information about the product. In addition, by gathering information online and making the final purchase offline, it can infer consumer intentions to avoid the risk of delivery.

4.3. Quality of online reviews' effect

To discover whether the WI can be affected by quality, the review was coded as 1 for the review of high quality (F (1,334) = 9.7125, p < .05, = .28). The quality of reviews is significant on account of t-value of quality variables is −3.116 (p < .05). However, H3a is not adopted as the review quality does not care about DOS (Table 10). As a result of quality's main effect, the higher quality reviews much affect the WI than the lower quality (High quality = 2.921 *vs.* Low quality = 3.487). H3b is supported.

This means that with respect to the effect of negative reviews on online shopping distrust, the

Table 8. Mediator effect (NR → DOS → WI).

	R²	F	β	SE	t	LLCI	ULCI
X → M	.127	24.163 (1166)***	.264	.054	4.916***	.1581	.3703
X, M → Y	.464	71.314 (2165)***	.324	.049	6.573***	.2264	.4208
			.463	.066	6.974***	.3320	.5943
Total effect X on Y	.306	73.046 (1166)***	.4459	.0522	8.547***	.3429	.5489
Direct effect of X on Y			.3236	.0492	6.573***	.2264	.4208
Indirect effect of X on Y			.1224	.0355		.0569	.1950

(Note: N = 290. Robust regression coefficients are reported together with standard errors in parentheses. *p < .05, **p < .01, ***p < .001, significance levels are two-tailed).

Table 10. The quality of reviews' main effect.

	B	SD	β		t
(Constant)	3.204	.064		49.870 (.000)***
Quality of Review	−.283	.091	-.168	−3.116 (.002)*

Dependent Variable: WI.

Table 11. Mediator effect (Q → DOS → WI).

	R²	F	β	SE	t
X M	.0058	1.9347 (1,334)	.1130	.081	1.391
X, M Y	.2970	70.353 (2,333)***	-.349	.077	4.504***
			.588	.052	11.284***
Total effect of X on Y	.0283	9.7125 (1,334)***	-.2832	.091	−3.116*
Direct effect of X on Y			-.3496	.077	−4.504***
Indirect effect of X on Y			.0665	.0487	

higher the quality of the negative reviews - the stronger the context for the negative reviews - the stronger the reader's distrust of online shopping. However, a low-quality review is a review with an ambiguous basis for negative reviews, which means that consumers increase their intentions for webrooming through online reviews.

To verify H4, we set the type of review and the quality of the review to 2*2, handing out a randomly assigned questionnaire to 200 respondents and inquiring about their WI (see Table 11). As summarised in Table 12, there is no main effect of review quality (t = 1.673, p > .05), but there is interact effect (t = 27.995, p < .001), on WI (see Fig. 1).

From the average estimate (Fig. 2), high-quality negative reviews have more impact on online shopping distrust for products, and lower quality negative reviews have more impact on online shopping distrust for delivery ones. This can be interpreted as a situation where consumers read reviews while checking information about products when they focus on the context, which is the quality of reviews.

To discover the effects of each review, reciprocal analysis was performed by creating interaction

Table 12. ANOVA regarding the type and quality of online reviews.

Dependent Variable: WI

	Coeff	t
(Constant)	1095.61	1514.668 (.000***)
TYPE	32.49	44.917 (.000***)
QUALITY	1.21	1.673 (.199)
TYPE * QUALITY	20.25	27.995 (.000***)

R² = .437 (Adjusted R² = .420).
*p < .05 **p < .01 ***p < .001.

Type and quality of reviews
Dependent variables: WI

Fig. 2. Average estimates of TYPE and QUALITY.

terms. We created an interaction term for each item and compared the R-squared variation of each model (see Table 13).

In the case of negative reviews with different qualities, the effect of the independent variables as dependent variables in model 1 was examined, and the influence of the independent and moderator variables on the dependent variables in model 2 was examined. The R-squared and the variable changes were analyzed and demonstrated the significant probability of F changes since it is statistically significant in step 3 (p = .019*).

The high-quality negative product reviews have a moderate effect, although model 1 is not significant as p-value is .460, driving the significance level of models 2 and 3 with the moderate variable (p < .001). To diagnose the multicollinearity, we checked the variance inflation factor (VIF) indices − 1.002 and 1.581, which are less than 10. Since the VIFs, can be said to be suitable for performing a moderate regression analysis.

It can be confirmed that the significance level of the interaction term is statistically significant. We estimated that the high-quality negative product reviews control the influence of the type of review on WI.

The lower quality product reviews (Table 14) show the significant interaction term (=.043*). It discovered that a low-quality negative product review is much significant than high-quality one in controlling the influence of the type of review (Supporting H4a). In the case of delivery reviews, it revealed that the interaction term was not statistically significant (high-quality p = .802, low-quality p = .765). That is, negative delivery reviews of high and low quality do not show a moderating effect on the influence of the type of independent review on the distrust of online shopping as a dependent variable. Although there is an interaction effect between the type of review and DOS, H4b is not statistically supported.

Table 13. Analysis of the interaction terms of Negative Reviews and QUALITY.

	M1	M2	M3
R^2	.008	.615	.649
Adjusted R^2	-.007	.591	.620
ΔR^2	.008	.607	.033
F	.552 ($p = .460$)	24.801 ($p = .000***$)	22.538 ($p = .000***$)
ΔF	.552 ($p = .460$)	32.616 ($p = .000***$)	5.802 ($p = .019*$)
(Constant)	-.726 ($p = .470$)	−4.660 ($p = .000***$)	−4.521 ($p = .000***$)
Product-review	.743 ($p = .460$)	1.309 ($p = .195$)	1.186 ($p = .240$)
High Quality		4.343 ($p = .000***$)	4.718 ($p = .000***$)
P_Type*h_Quality			2.409 ($p = .019*$)

Dependent Variable: WI.
*$p < .05$ **$p < .01$ ***$p < .001$.
Model 1 = (Constant), Type_A
Model 2 = (Constant), Type_A, High Quality.
Model 3 = (Constant), Type_A, High Quality, Interaction terms (Type_A * High Quality).

Comparing with the results of H2b, the results show that delivery reviews affect online shopping distrust, but the quality of reviews does not increase or decrease this influence.

4.4. Effect of NFT on online shopping

We examined two products: a t-shirt (high NFT) and a keyboard (low NFT). Three hundred twenty-six participants responded, raking their NFT on a 4-point turnstone scale without a neutral point.

As a result of testing the moderating effect of NFT on the relationship between the types of reviews

Table 14. The result of interaction terms between type and quality.

	B	SD	β	t
Type_A * High Quality	.211	.088	.292	1.677 (.019*)
Type_A * Low Quality	.369	.079	.063	2.409 (.043*)
Type_B * High Quality	.001	.010	.001	.123 (.802)
Type_B * Low Quality	.002	.010	.002	.171 (.765)

Type_A: Product-descriptive reviews.
Type_B: Delivery-descriptive reviews.
Dependent Variable: Distrust of Shopping.
*$p < .05$ **$p < .01$ ***$p < .001$.

and WI, the R-squared (see Table 15) appears to increase gradually from .8. It can be argued that a significant landing also has a moderating effect (H5 is supported).

The regression analysis results (Table 16) suggest that high and low NFT have a significant influence on WI (F (2,324) = 1651.58; $p < .001$). A comparison shows that high NFT has a much greater effect on WI than low NFT (t$_{high\ NFT}$ = 28.255*** vs t$_{low\ NFT}$ = 6.979***).

4.5. All variables about negative online reviews

Under the webrooming condition, distrust of online shopping is a vital explanatory variable. As the impact of distrust on purchasing decisions has been more strongly associated with online channels (Forsythe and Shi 2003), we suggest that distrust of online shopping is a mediator variable on consumer webrooming intentions. To validate this, we perform a multiple regression analyses. Besides, we made full survey scenarios into the independent variable: 2 type * 2 quality * 2 NFT. As result, the

Table 15. The results of hierarchical multiple regression analysis using NFT.

	M1	M2	M3
R^2	.008	.959	.983
Adjusted R^2	.002	.959	.983
ΔR^2	.008	.952	.024
F	1.264 ($p = .263$)	1929.726 (p .000***)	3146.052 ($p = .000***$)
ΔF	1.264 ($p = .263$)	3828.875 ($p = .000***$)	228.353 ($p = .000***$)
(Constant)	3.305 ($p = .000***$)	.223 ($p = .000***$)	.949 ($p = .000***$)
NR	.032 ($p = .263$)	-.024 ($p = .000***$)	-.012 ($p = .001***$)
NFT		.956 ($p = .000***$)	.414 ($p = .000***$)
NR*NFT			.090 ($p = .000***$)

Dependent Variable: WI.
*$p < .05$ **$p < .01$ ***$p < .001$.
Model1 = (Constant), NR.
Model2 = (Constant), NR, NFT.
Model3 = (Constant), NR, NFT, Interaction term (NR*NFT).

Table 16. Each NFT regression analysis results.

	B	SD	β	t
(Constant)	.096	.061		1.572 (.120)
High NFT	.775	.027	.818	28.255 (.000***)
Low NFT	.197	.028	.202	6.979 (.000***)

Dependent Variable: WI.
*p < .05 **p < .01 ***p < .001.

Table 17. The effects of mediator variables.

	β	SE	t-value (p-value)
Mediator variable model (DV = DOS)			
Predictor	.29	.08	839.7 (.030*)
Negative online reviews			
Mediator variable model (DV = WI)			
Predictor	.45	.05	9.34 (.000***)
Negative online reviews			
Full model (DV = WI)			
Predictor	.52	.17	2.58 (.020*)
Negative online reviews	.267	.096	2.140 (.030*)
DOS			

*p < .05 **p < .01 ***p < .001.

Table 18. Reviews' effects on webrooming intention.

	B	SD	β	t	p
(Constant)	2.166	.578		3.75	.000***
t_ANH	.279	.1	.285	2.789	.006**
t_ANL	.198	.116	.168	1.713	.040*
t_BNH	.036	.111	.032	.325	.746
t_BNL	.184	.099	.189	1.856	.046*
k_ANH	.345	.114	.287	3.029	.003**
k_ANL	.061	.113	.055	.537	.592
k_BNH	.179	.101	.178	1.774	.049*
k_BNL	.264	.083	.292	3.17	.002**

Dependent Variable: WI (Webrooming intention).
*p < .05 *p < .01 ***p < .001.

independent variable's influence was (F $(2,203)$ = 7.704; P = .007) on DOS and (F $(1,204)$ = 5.786; P = .000) on webrooming intentions (WI). The review and mediator variables' effects on WI are (F $(9,196)$ = 180.113; P = .000; R = .986, R square = .973, adjust_R = .97). Therefore, the mediating effect of distrust on online shopping is partially significant in the relationship between online review and webrooming intentions (see Table 17).

To evaluate H6, the results were observed for all fully confirmed virtual online reviews in the survey experiment. This experiment was conducted using two products, t-shirts and keyboards. Table 18 summarises the results.

For the t-shirt product, the high-quality product-descriptive reviews (.006**) and low-quality of ones (.040*), and low-quality (.046*) of delivery-descriptive reviews were statistically significant at p < .05, while the high-quality delivery-descriptive reviews

(.746) were not. The high-quality product reviews had the largest influence on WI; therefore, H6a is not supported. We conclude that product reviews are more influential in generating WI for products for which customers have a high need for product experience. On the other hand, negative product reviews have more influence on WI than negative delivery reviews. This finding contrasts with the results of the two types of reviews as related to online shopping distrust.

For the keyboard product, the high-quality product (.003**) and the low-quality delivery (.002**) reviews are significant at p < .01, while the high-quality delivery review (.049*) is significant at p < .05. However, the low-quality product review (.746) is not statistically significant. That is, H6b holds only for products with low customer need for product experience such as a keyboard, low-quality negative delivery reviews affect WI. Unlike t-shirts, which have high NFT, for products with low NFT, negative delivery reviews have more impact on WI than product reviews. Consequently, these results demonstrate that customers purchasing products with high NFT have much influence on their WI when exposed to product information, whereas for products with low NFT, the same holds when the customer is exposed to delivery information (see Fig. 3.)

We plot the predictions of our regression analysis and of residuals using scatter plots. The predicted value of the standardized residuals in Fig. 4 demonstrates a positive linear relationship, and the standardized predicted values have an explanatory power in the regression model through the distribution of points showing a linear scatterplot. However, the scatterplot of the standardized value of the regression analysis shows a slope indicating a slight positive relationship, so it can be said that this shape with a new variable could explain the webrooming intentions, the dependent variable.

5. Conclusion and discussion

5.1. Summary of findings

Living in modern society enables consumers to obtain diverse information about products via multiple channels, leading to the increased frequency of webrooming behaviour. After reading online reviews, webroomers migrate to an offline channel for their purchase. We have explored how online reviews affect webrooming intentions by utilizing a mixed approach: we use the inductive research method to collect the empirical data, and the deductive research method to verify the hypotheses through surveys.

Type and quality of reviews and NFT(t-value)
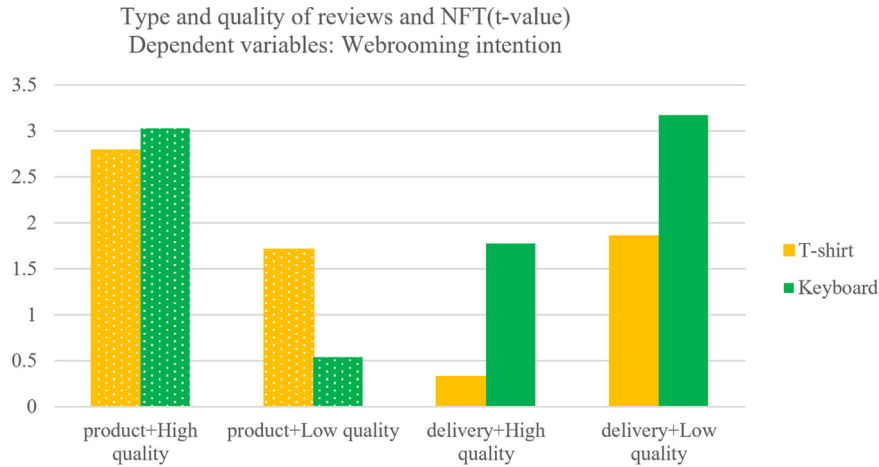Dependent variables: Webrooming intention

Fig. 3. The coefficient value for each review affecting webrooming.

As observed, product and delivery reviews have a significant effect on consumer distrust of online shopping; more specifically, consumers feel more webrooming intention when presented with delivery reviews rather than product reviews (H2). In addition, although the low quality of delivery reviews does not affect the distrust of online shopping, it is confirmed that low-quality product reviews increase the distrust of online shopping (H4a). Furthermore, the greater the NFT, the more consumers need to be confident regarding the information. In this case, reading low-quality reviews increases your willingness to webrooming (H5 and H6). Even though the review quality plays a key role in moderating the DOS, the level of impact is different depending on the need for touch. When

purchasing products with low NFT, customers are more influenced by low-quality delivery reviews (H6b).

5.2. Key contributions

5.2.1. Academic contribution

We have identified a lack of research related to multi-channel behaviour, specifically on webrooming. Thus, our webrooming research, supported by empirical evidence contributes to the field of multi-channel research. Especially, this study can be added to the theoretical contribution to webrooming research that examines consumers' use of multi-channels in two stages, reverses online channels in the search stage, and uses offline channels in the
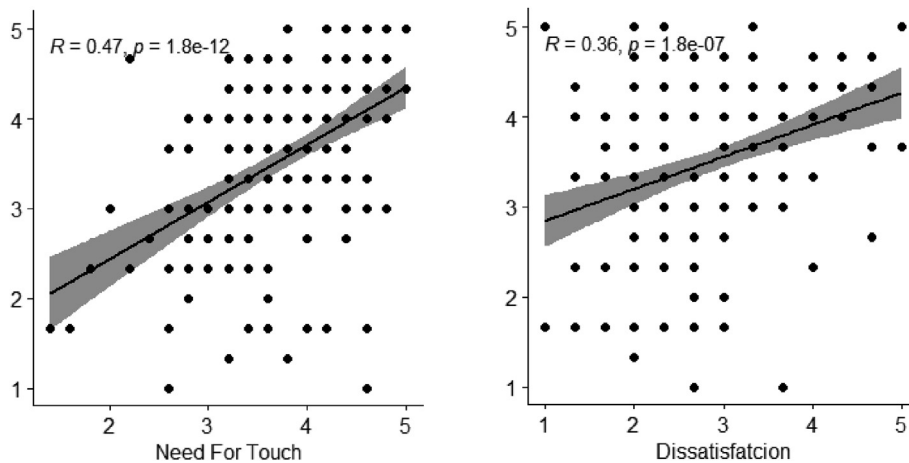
Fig. 4. The ggscatter graph by cor. coef.

purchase stage. In addition, we quantify the impact of online reviews on purchase intentions and highlight the importance of the quality of online reviews. Since online reviews play a vital role for both consumers and retailers, our results alleviate the uncertainty associated with online shopping. Furthermore, this paper could contribute to the methodology. Being undertaken the 2 approachmethods, it can be proper sample for other research which the need the high validity or try to analyze the online review to reveal online customer behaviour.

5.2.2. Management contribution

Although negative online reviews do not appear to affect online retailers' sales, low-quality negative reviews increase consumer uncertainty and affect consumers' information processing and decisionmaking during online shopping. Our results highlight the importance of managing negative online reviews. Consumers who are exposed to low-quality negative reviews experience an increased distrust of online shopping and switch to offline stores to experience and purchase products. Online retailers can understand the consumer's decision journey through the stages of research and purchase and evaluate how online research impacts consumer purchase behaviour, therefore, omnichannel retailers can make strategic decisions based on our findings. For example, offline stores can attract consumers to given physical products, or they can estimate the consumer migration rate based on the presence of low-quality negative reviews which drive up consumers' uncertainty. As consumers tend to be more dependent on online reviews to minimize the risk associated with online purchases, this paper has contributed to the existing literature by demonstrating that the quality of reviews plays a crucial role in consumers' multi-channel shopping behaviour.

5.3. Limitations and future research

This research has a few limitations which can be addressed in future research. First, although the virtual online reviews in our survey were constructed by crawling websites for actual reviews, we only collected 4000 reviews for each product using Coupang.com. Also, we selected only two items in our experiment. To improve the generalisability, future researchers can consider using other products, and scraping larger numbers of online reviews. In stimulus in the survey, we do not suggest the volume of various reviews by manipulating the volume. The higher the volume, the more quality reviews you can see. As suggested in the previous study, it is expected that by manipulating the volume of reviews in various ways, it is expected that it will be possible to find out how negative reviews with low quality will affect consumers.

Second, our research is limited in that we do not consider changes in consumer behaviour driven by the quality of positive reviews. Although we tried to reveal the mechanism of webrooming intention considering high- and low-quality negative reviews, it is regrettable that there was no interaction identified between the quality and the valance of the positive reviews. Thus, future research could explore the various scenarios and conditions not covered in this paper.

Third, we utilized three factors to classify the quality of the online reviews. However, there are diverse ways to complete such a distinction such as the quality of the text, representativity, and length and depth of reviews, to name a few. Therefore, there is a need to test the classification of such reviews. As various methods for text mating have recently been developed, it is possible to identify the quality of reviews using machine learning, such as automatic text classification analysis methods and Support Vector Machine (SVM). By classifying the quality using machine learning, the hypotheses can be further tested using sophisticated text mining analysis methods of substantive data.

In our research, we only considered two purchase channels: offline and online. However, further research related to the applications of our findings in the mobile market is required. This would enable companies to devise strategies to manage reviews for various channels using research in the mobile market.

Finally, this study can be the future research in various product categories. Product categories can be divided into search goods and experience ones. According to Kim (2021), the findings in experience goods showed the effect of low consumer ratings is greater than that of high ones. For experience goods that are difficult to evaluate before experiencing the product, the importance of online reviews about experience goods may be higher. When researching this, it is thought that a product review can be more important than a delivery review. In addition, it can be divided into hedonic products and utilitarian products, and when purchasing each product through an online channel, it is possible to study what type of reviews consumers see to make a purchase decision or to leave the channel.

Appendix 1. Setting up virtual T-shirt reviews of different quality

Type	Valance	High Quality (Claim, Data, and Backing)	Low Quality (Claim Only)
Product-descriptive review	Positive	It's cost-effective. I usually wear 100 size, but the large size fits me well. It is a white undershirt, so it is a little bit light but sturdy. Compared with other companies' t-shirts, likes Uni* and Geo*, this is no problem. I used it for a week and there was no problem of sagging.	
	Negative	It was a size large, which shrunk to a medium after washing and drying. Also, when I first saw this t-shirt, the bottom stitching appeared to have not been done properly. The material is also rough, I am not recommending this for sensitive consumers.	It is not a size large. It has now shrunk to a size medium and I cannot wear it. Also, since I first saw this t-shirt, I thought it wasn't good. I thought the price of this t-shirt was too cheap for a good item. I do not recommend.
Delivery-descriptive review	Positive	I normally do not have time to go shopping after work, so I ordered the t-shirt at night via the mobile store. Amazingly, this product's shipping was so fast. I could wear it to work right away. Also, its packaging is made of eco-friendly paper, and I can get rid of the packing easily.	
	Negative	I expected a new, white t-shirt, but there are some ash stain and the item is wrinkled. I notified the seller and tried to return it or get a refund at no additional cost, but that was not the case. Even though this product's shipping is free, you must check the return policy before purchasing it.	I wanted a refund for this product because of some stains, but it is impossible. I cannot believe that only delivery is free but not for return. I think their policy is implausible and so unfair to customers. It makes me feel bad.

Appendix 2. Experimental Design

	High quality	Low quality
Product review	Situation 1: When there are some positive reviews on online shopping channels, negative product reviews are high quality. [Survey group 1]	Situation 2: When there are some positive reviews on online shopping channels, negative product reviews are low quality. [Survey group 2]
Delivery review	Situation 3: When there are some positive reviews on online shopping channels, negative delivery reviews are high quality. [Survey group 2]	Situation 4: When there are some positive reviews on online shopping channels, negative delivery reviews are low quality. [Survey group 1]

Appendix 3. Survey sample characteristics

		n	%
Gender	Female	92	45.1
	Male	112	54.9
	Total	204	100
Age	10~19	4	2
	20~29	170	83.3
	30~39	18	8.8
	40~49	4	2
	50+	8	3.9
	Total	204	100

Appendix 4. Descriptive statistics and ANOVA table by online review type

Descriptive Statistics						ANOVA				
WI	N	M	SD	SE		WI	SS	df	ME	F
Product	168	3.203	.838	.062		Between groups	6.735	1	6.735	9.712 (.002**)
Delivery	168	2.920	.827	.063		Within groups	231.602	334	.693	
Total	336	3.062	.843	.046		Total	238.336	335		

Appendix 5. Independent sample test results by online review type

Independent sample test

		Levene	t-test for Equality of Means			
		F	t	df	MD	SE
DOS	Equal Variance assumed	2.145 (.146)	5.604 (.000***)	98	1.080	.193
	Equal Variance not assumed	5.604	(.000***)	97.293	1.080	.193
WI	Equal Variance assumed	.001 (.971)	3.116 (.002**)	334	.283	.091
	Equal Variance not assumed		3.116 (.002**)	333.940	.283	.091

*$p < .05$ **$p < .01$ ***$p < .001$

Appendix 6. Summary of hypotheses results

	Description	Result
H1	Negative online reviews affect the distrust of online shopping (H1a) and intention of webrooming (H1b).	All Supported
H2a	Negative delivery reviews affect the distrust of online shopping more than negative product reviews.	Supported
H2b	Negative delivery reviews affect the webrooming intention more than negative product reviews.	Supported
H3	Low-quality reviews influence on the distrust of online shopping (H3a) and intention of webrooming (H3b).	H3a: Not supported, H3b: Supported
H4a	Low-quality reviews increase the impact of negative product reviews on the distrust of online shopping.	Supported
H4b	Low-quality reviews increase the impact of negative delivery reviews on the distrust of online shopping.	Not supported
H5	The higher Need for Touch (NFT) increase the impact of negative reviews on the webrooming intention	Supported
H6a	For high NFT products, lower quality product reviews impact webrooming intentions.	Not Supported
H6b	For low NFT products, lower quality delivery reviews impact webrooming intentions.	Supported

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