

Exploring brand attitude in e-commerce using the S-O-R model: the role of information quantity, information quality and source credibility

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Abstract

Purpose – E-commerce platforms in the digital age have become essential to showcase information to consumers about products and brands. This study aims to analyze how social signals (information quantity, information quality and source credibility) influence the emotions of pleasure, arousal and dominance, and how these emotions affect brand attitude and consumer purchase intention.

Design/methodology/approach – The data for this study were collected from 835 e-commerce consumers through an online questionnaire distributed by a panel company. The hypotheses were tested by means of a structural equation modeling with Amos software.

Findings – The results reveal that information quantity, information quality and source credibility can affect the emotions of certain e-commerce consumers. Specifically, information quantity positively influences pleasure and dominance, information quality positively affects arousal and dominance and source credibility positively influences all three emotions. The findings also confirm that pleasure and dominance are clear determinants of brand attitude. Finally, pleasure, dominance and brand attitude are positive determinants of purchase intention, whereas arousal results in the opposite.

Practical implications – The findings suggest that marketers should implement tools on platforms that encourage consumers to generate enough credible reviews to convey feelings of pleasure and control which will generate positive attitudes toward brands leading to bolster purchase intention.

Originality/value – This study is original in that it integrates the stimulus-organism-response theory and the pleasure-arousal-dominance model in e-commerce research. Specifically, pleasure, arousal and dominance serve as organisms to identify the roles of information quantity, information quality and source credibility as stimuli, and brand attitude and purchase intention as responses in the understanding of the source of consumer brand attitude.

Keywords E-commerce, S-O-R theory, Pleasure-arousal-dominance model, Brand attitude, Purchase intention

Paper type Research paper

1. Introduction

The way individuals purchase products and interact with brands has evolved greatly since the introduction of electronic commerce. With more than one-third of the global population shopping online, e-commerce has become a \$6tn industry in 2024 and is expected to attain \$8tn by 2027 (Coppola, 2024; Sellers Commerce, 2024). The massive adoption of this technology has led to an evolution of the concept of e-commerce from a type based on a purely commercial relationship between brand sellers and consumers to one that is more social and collaborative due to various interactive tools integrated into the electronic platforms (Petrescu *et al.*, 2024). This has triggered an increase in brand attitude as consumers themselves can now review and process brand information (Hong *et al.*, 2022).

Atmospheric cues in e-commerce are crucial to foster positive brand attitude and approach behavior due to the impossibility of physically evaluating products (Wells *et al.*, 2011). Existing literature evidences a gap on how social cues such as information quality (measured by persuasiveness and informativeness), information quantity and source credibility influence the emotions

that define behavior (Rasmus *et al.*, 2024). Previous research has prioritized design and atmospheric aspects, ignoring key social factors (Zhu *et al.*, 2024) and assuming a hierarchical ranking of atmospheric cues (Chang *et al.*, 2014; Hsieh *et al.*, 2014).

A series of studies have revealed that pleasure, arousal and dominance are subjected to the effects of informativeness (Habib and Qayyum, 2018; Lamis *et al.*, 2022; Liu *et al.*, 2024), amount of information (Bufquin *et al.*, 2020), authenticity (as measured by

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source credibility and information accuracy) (Liu *et al.*, 2024) and information credibility (Chang *et al.*, 2018). However, these studies mostly only take into account one or two of these emotions. There appears to be a gap regarding the effect of emotions on brand attitude, with some controversy as to the significance of the relationship between emotions and attitude (Li *et al.*, 2018; Mehrabian and Russell, 1974). The current state of research assumes that these emotions positively influence attitude toward both a website and a product (Richard and Chebat, 2016). Dominance, in turn, negatively influences attitude toward advertising (Kim *et al.*, 2020), and positive emotions, when interacting with chatbots, improve brand attitude (Kirkby *et al.*, 2023). These inconsistencies highlight the need to delve deeper into how these emotions influence attitudes toward brands.

It is also of interest to explore consumer purchase behavior according to emotions and attitudes toward brands as purchase intention can be driven by pleasure and arousal (Hsieh *et al.*, 2014; Koo and Ju, 2010; Yang *et al.*, 2020). Previous studies have ignored dominance, an emotion relevant to e-commerce, as it represents a sensation of control over the purchase process (Mazaheri *et al.*, 2014). Although arousal has generally been considered a positive emotion (Laroche *et al.*, 2022; Richard and Chebat, 2016), our study suggests that it may be negative due to the stress, nervousness and anger the consumer experiences during e-commerce purchasing due to the overload of signals and data he/she is required to process (Ghosh *et al.*, 2024; San Martín *et al.*, 2011).

Consumer behavior in the e-commerce framework is characterized by multiple dimensions. Certain consumers come to immediate decisions while others delay their purchase by adding a product to the cart for an extended period of time (Zeng *et al.*, 2019). Given this diversity, e-commerce purchase behavior analyses are particularly relevant (Wilson *et al.*, 2019). However, as measuring and predicting actual behavior is so complex, this study has resorted to purchase intention as it is an adequate predictor of actual consumer behavior and the final outcome of the purchase process (Wang and Herrando, 2019).

Attitude theories suggest that purchase intention is formed and modified among consumers (Lo and Qu, 2015). Brand attitude, in turn, refers to the beliefs among consumers toward a product or service based on whether it responds to their needs (Keller, 1993). This concept is particularly relevant as it not only serves as a reference point for choosing a product (Han *et al.*, 2019) but also contributes to enhancing its market share (Baldinger and Rubinson, 1996).

Given the relevance of brand attitude and purchase intention, each was addressed from the standpoint of different attitudinal theories. A research gap has nonetheless remained on how consumer emotions, affected by atmospheric cues available on platforms, influence brand attitude and purchase intention. Due to the increase of accessibility to reviews by other consumers associated with the expansion of e-commerce, this study resorted to the stimulus–organism–response (S-O-R) theory, which sheds light on how elements of the environment influence individual behavior. Emotions were thus incorporated into the S-O-R model to examine how cues from store environments influence consumer organisms and elicit responses (Eroglu *et al.*, 2003). Moreover, these emotions were associated with attitudes toward brands by adding an affective element (Brown *et al.*, 1998). Hence, based on these notions, the S-O-R model in the framework of online

commerce is appropriate in exploring the antecedents of brand attitude and purchase intention.

This leads to the central question of this study, that is, how certain social cues that serve as stimuli on e-commerce platforms influence responses such as brand attitude and purchase intention mediated by the affective component. Specifically, the relevance of this analysis lies in its responses to the following research questions:

- RQ1. How do social atmospheric cues such as information quality, information quantity and source credibility influence the emotions of pleasure, arousal and dominance?
- RQ2. How do the emotions of pleasure, arousal and dominance influence brand attitude and purchase intention?
- RQ3. How does brand attitude influence consumer purchase intention in e-commerce?

The approach to these questions combining the S-O-R and pleasure-arousal-dominance models contributes to existing knowledge on how social signals present on e-commerce platforms (such as the quality, quantity and credibility of reviews) influence the three key emotions and, consequently, brand attitude and purchase intention. In contrast to previous research that has focused primarily on pleasure and arousal, this study also takes into account the emotion of dominance as a mediating variable by highlighting its impact on consumer behavior. It also examines the role of each social cue on each emotion, which clarifies the contradictory notions identified in previous work.

The sections subsequent to the introduction are organized as follows: Section 2 consists of a literature review and explains the development of the hypotheses. Sections 3 and 4, respectively, present the methodology and results. Section 5 discusses the findings, reflects on the theoretical and practical implications, highlights its limitations and advances future lines of research.

2. Theoretical framework and hypotheses development

2.1 The stimulus–organism–response theory

The S-O-R theory holds that environmental stimuli have an impact on individual behavioral responses through emotions (Kusumasondjaja and Tjiptono, 2018). The model comprises three components: stimuli from the atmosphere (stimulus), emotional states (organism) and approach or avoidance responses (response) (Mehrabian and Russell, 1974). This theory can be combined with the pleasure-arousal-dominance theory by integrating affective elements, such as the internal state of the consumer, to identify the distance between the organism and the response (Shah *et al.*, 2023; Zhu *et al.*, 2024). To examine the different stimuli present in e-commerce platforms on consumer responses through the emotions they provoke, this study applied the pleasure-arousal-dominance theory proposed by Mehrabian and Russell (1974). Pleasure is defined as the extent where individuals feel happy, satisfied, joyful and comfortable with their environment. Arousal, in turn, corresponds to the extent they feel or are stimulated, aroused, alerted or activated by situations. Finally, dominance

equates with the sense of control, autonomy and freedom of individuals with respect to their environment (Hsieh *et al.*, 2021).

The specialized literature has identified two currents related to the affective dimensions serving to examine emotions. Certain authors situate pleasure, arousal and dominance at the same hierarchical level, while others place them at different levels (Chang *et al.*, 2014; Hsieh *et al.*, 2014). The present study considers the three dimensions as independent variables, an approach adopted to examine whether social cues act as specific atmospheric indicators of each affective dimension.

Prior e-commerce research has focused on how the emotions of pleasure, arousal and dominance mediate between environmental cues and behavioral responses (Bues *et al.*, 2017; Lamis *et al.*, 2022; Loureiro *et al.*, 2020). In general, the findings of these authors are that various cues linked to electronic environments (formality and aesthetic appearance, entertainment or informativeness of the website) influence consumer behavior through the emotions experienced during the purchase process. Recent work has also identified atmospheric and design factors as stimuli while tending to overlook social factors that may influence consumer feelings during purchases, in spite of the fact that the different emotional experiences of consumers identified in the information lead to approach behavior (Shah *et al.*, 2023). As reviews are signals that provide product information and convey emotions that can influence purchase by new consumers (Zhu *et al.*, 2024), it is critical to incorporate the pleasure-arousal-dominance theory when analyzing how they are viewed. This reinforces the relevance of combining the pleasure-arousal-dominance and S-O-R theories in e-commerce research.

2.2 Atmospheric signals in e-commerce platforms

2.2.1 Information quality and pleasure-arousal-dominance

Recent research has also focused on evaluating information quality through informativeness and persuasiveness (Zhang *et al.*, 2014). Informativeness here refers to the perceived quality of a website or electronic platform (Hsieh *et al.*, 2021). The cognitive definition of the term “persuasion knowledge” proposed by Friestad and Wright (1994) is the most widely adopted by the literature (Eisend and Tarrahi, 2022). The expression stems from the persuasion knowledge model originally defined from the point of view of each party or factor (target, agent and intent) involved in an interaction. The target in this model represents the individual to whom the act of persuasion is addressed, the agent the person responsible for the persuasive act and the intent the perception that the addressee of the action carried out by the agent to influence his/her behavior.

Informativeness is a key environmental cue influencing emotions. Several e-commerce studies have identified its positive impact on consumer dominance, pleasure and arousal (Habib and Qayyum, 2018; Hsieh *et al.*, 2014; Lamis *et al.*, 2022; Liu *et al.*, 2019). Similarly, informativeness in forums and blogs is demonstrated to increase the sense of consumer control and dominance (Chang *et al.*, 2018). Observations of certain apps suggest that informativeness influences user emotions (Kumar *et al.*, 2023) and that aesthetic formality (measured by simplicity, structuring, ease of browsing and text readability) enhances pleasure, arousal and dominance (Rejón-Guardia, 2024). Although most research highlights the

important role of informativeness in generating emotion, little work has focused on persuasion as an environmental cue. Only one study has examined its effect in this framework to measure its impact on emotions. Its findings are that persuasion generates pleasure and arousal among users due to the persuasiveness of reviews (Ruiz-Mafe *et al.*, 2020).

The findings of another study on emotions (Hsieh *et al.*, 2021) suggest that high quality information positively and significantly influences consumer dominance. Other recent research has identified that information utility, linked to information quality, positively influences both pleasure and arousal among consumers of mobile social commerce (Liu *et al.*, 2024). There is nonetheless little work on the effect of information quality on the emotions of pleasure, arousal and dominance. This is due to the fact that research on informativeness, one of the dimensions to measure information quality, has tended to ignore the impact of persuasiveness, its other dimension, on these emotions. So far, empirical evidence on this issue is limited to a single study that identifies a positive effect of persuasiveness of reviews on pleasure and arousal (Ruiz-Mafe *et al.*, 2020).

In commercial contexts marked by asymmetry of information between parties, consumers place greater value as to the information about the quality of a product as it reduces uncertainty and yields a feeling of being more in control of the purchasing process. To evaluate this quality, consumers must engage in systematic processing (Zhang *et al.*, 2014), which requires them to make a greater effort to reduce uncertainty. This cognitive effort can generate a state of nervousness or continuous alert during the processing of the information of the reviews (San Martín *et al.*, 2011). This leads to the following hypotheses:

- H1a. Information quality of e-commerce platforms positively influences consumer pleasure.
- H1b. Information quality of e-commerce platforms positively influences consumer arousal.
- H1c. Information quality of e-commerce platforms positively influences consumer dominance.

2.2.2 Information quantity and pleasure-arousal-dominance

The availability of a large amount of information about products on e-commerce platforms is an advantage over that of traditional transactions as it can reduce consumer uncertainty (Liu *et al.*, 2019). Specific information about products available on e-platforms can also yield positive emotions and significantly affect consumers' behavior as it can satisfy their needs when facing overwhelming data (Richard and Chebat, 2016). When consumers benefit from access to sufficient information that reduces product uncertainty, they may feel more in control and perceive a greater mastery over the decision-making process (Hsieh *et al.*, 2021). For example, recent research suggests that hotel websites accompanied by a great number of images yielded more enjoyment (Bufquin *et al.*, 2020). However, this study did not identify any significant relationship between the number of images and the level of user stress.

Concerning information quantity, a greater amount of information allows consumers to reduce uncertainty about a product which prompts them to feel more in control of the

purchasing process (Hsieh *et al.*, 2021). It has also been suggested that a greater number of photographs can increase perceived enjoyment, while more reviews can generate pleasure and happiness. Several studies also support the notion that greater information raises consumer arousal during purchases. These views point to an increase in arousal as a consequence of the excitement generated from access to all available reviews (Chang *et al.*, 2018; Massara *et al.*, 2010; Menon and Kahn, 2002). These ideas lead to the following hypotheses:

- H2a. Information quantity in e-commerce platforms positively influences consumer pleasure.
- H2b. Information quantity in e-commerce platforms positively influences consumer arousal.
- H2c. Information quantity in e-commerce platforms positively influences consumer dominance.

2.2.3 Source credibility and pleasure-arousal-dominance

A number of studies suggest source credibility to be another environmental cue that consumers process heuristically or systematically. This refers to the degree of veracity they perceive as to the information disseminated by other consumers on platforms or websites about a product and/or a service (Kim and Han, 2014).

Although certain studies have examined the influence of source credibility on consumer adoption of information and information usefulness (Coursaris and Van Osch, 2016; Filieri, 2015; Teng *et al.*, 2014), research on its impact on consumer emotions remains largely unexplored. For example, in the field of advertorials, credibility was found to have a positive effect on user control and dominance (Chang *et al.*, 2018). On the other hand, information authenticity, measured by source credibility and information accuracy, was determined to positively influence pleasure and arousal (Liu *et al.*, 2024). Consequently, one of the aims of this study is to examine the effect of source credibility on the emotions of pleasure, arousal and dominance.

Prior research has likewise found that the credibility of individuals transmitting information will presumably also influence consumer emotions. Consumers tend to experience a greater sense of control when they perceive the source of information about a product or service to be reliable and truthful. This perception of truthfulness reduces uncertainty during purchases generating positive emotions. This leads to the following hypotheses:

- H3a. Source credibility in e-commerce platforms positively influences consumer pleasure.
- H3b. Source credibility in e-commerce platforms positively influences consumer arousal.
- H3c. Source credibility in e-commerce platforms positively influences consumer dominance.

2.3 Pleasure-arousal-dominance, brand attitude and purchase intention

2.3.1 Impact of pleasure, arousal and dominance on brand attitude

Brand attitude is defined as the overall evaluation by consumers of a brand (Keller, 1993). Marketing research has concluded that a brand's outstanding benefits are one of the primary

drivers of consumer attitude (Wu *et al.*, 2018). Although generated through exposure to and evaluation by a consumer (Keller, 1993), in e-commerce it is limited by the impossibility of physically interacting with the product, which prevents generating certain emotions and sensory experiences.

E-commerce research has concluded that pleasure, arousal and dominance positively influence attitude toward a website and a product (Richard and Chebat, 2016). Certain research has also confirmed that pleasure positively influences, whereas dominance negatively impacts attitude toward advertising (Kim *et al.*, 2020). Other findings reveal that animated images of e-commerce platforms yield a higher level of pleasure and arousal, which positively impacts attitude toward websites (Laroche *et al.*, 2022).

Despite its relevance, few studies have analyzed the impact of emotions on brand attitude, especially concerning e-commerce platforms. Previous work has confirmed that emotions felt by consumers after experiencing a sound logo as an atmospheric cue favorably increases brand attitude (Scott *et al.*, 2022). A recent study in the framework of applying artificial intelligence to electronic platforms has concluded that brand attitude is reinforced when consumers experience positive emotions while interacting with embedded chatbots (Kirkby *et al.*, 2023).

Another study, on the contrary, has suggested that a state of alertness can provoke an avoidance response (San Martín *et al.*, 2011). This negative relationship can be explained through negative emotions among consumers which can generate brand aversion (Iranzo Barreira *et al.*, 2024). Recognition by consumers that reviews are influenced by the platform of the brand can also lead to adverse emotions (e.g. anger), which can trigger unfavorable responses (Ghosh *et al.*, 2024). In fact, the dissemination of information associated with emotions can increase the intention of persuasion and prompt negative responses (Zhu *et al.*, 2024). In this sense, it is thought that stimuli deriving from reviews shared by other consumers that reflect persuasion intention or feelings promoted by e-commerce platforms will yield tense rather than energetic excitement. This will reduce consumer brand attitude prompting tension rather than relaxation. Accordingly, the following hypotheses are proposed:

- H4. Pleasure deriving from e-commerce platforms positively influences consumer brand attitude.
- H5. Arousal deriving from e-commerce platforms negatively influences consumer brand attitude.
- H6. Dominance deriving from e-commerce platforms positively influences consumer brand attitude.

2.3.2 Impact of pleasure, arousal and dominance on purchase intention

The impact of emotions on consumer behavior has been the object of research among different branches of social sciences, in particular that of information technology. Recent findings largely indicate that emotions are predictors of behavior. Both pleasure and arousal in the luxury restaurant framework were found to positively influence consumer intent (Ryu and Jang, 2007). Positive emotions were also confirmed to have positive effects on intentional behavior, while the contrary applies on

the whole to negative emotions (Jang and Namkung, 2009). Advertising analyses point out that pleasure, arousal and dominance positively influence purchase intention (Bues *et al.*, 2017). Similarly, studies on website reviews such as forums and blogs signal that pleasure bolsters purchase intention (Chang *et al.*, 2018). In the field of applications, pleasure, arousal and dominance positively influence both intention of continued use and loyalty of consumers and/or users of major brand apps (Hsieh *et al.*, 2021). The projected use of artificial intelligence for travel planning is also presumably driven by pleasure and dominance (Xu *et al.*, 2025).

Other analyses along these lines have established arousal to spur positive behavior. Yet others note that consumer arousal during e-commerce purchases when facing great uncertainty can heighten a state of alert. This gives rise to detrimental emotions that trigger adverse behavior reducing purchase intention. E-commerce consumers experience uncertainty due to the risk of fraud, which provokes a state of constant alertness closely related to tense arousal (Thayer, 1987). Therefore, excessive activation of this type leads consumers to adopt defensive postures, resulting in purchase cancellation. Several studies have confirmed that consumers reject purchases after experiencing high levels of arousal (Koo and Lee, 2011; Menon and Kahn, 2002). Emotions can likewise negatively influence purchase intention among consumers who consult reviews on social networks and blogs (Ghosh *et al.*, 2024). A potential reason for this negative response may be that consumers when sensing negative valence experience tense excitement and nervousness rather than relaxation (Fan *et al.*, 2015). These examples suggest arousal to be an emotion that prompts negative behavior.

In short, pleasure and dominance, based on the findings cited above, are in line with positive emotions, implying that both factors favor purchase intention. Arousal, on the contrary, is regarded as a negative emotion that decreases the intent. This leads to the following hypotheses:

- H7. Pleasure deriving from e-commerce platforms positively influences consumer purchase intention.
- H8. Arousal deriving from e-commerce platforms negatively influences consumer purchase intention.
- H9. Dominance deriving from e-commerce platforms positively influences consumer purchase intention.

2.3.3 Impact of brand attitude on purchase intention

Attitude as a stable and enduring predisposition toward behavior represents another essential element serving to identify and grasp individual conduct (Mitchell and Olson, 1981). Attitude throughout the last decades is believed to be closely linked to intention (Ajzen and Fishbein, 1980; Wu and Wang, 2011) and act as a determining factor in predicting behavior (Mitchell and Olson, 1981; Nayeem *et al.*, 2019). Moreover, in certain cases, brand attitude is considered the most relevant predictor of purchase intention (Abzari *et al.*, 2014).

In broad terms, recent research suggests that attitude positively affects consumer purchase intention (Tseng and Wang, 2023; Wang *et al.*, 2019). Specifically, brand attitude has positive effects on purchase intention among company-

generated and user-generated content in three different areas: tourism, telecommunications and pharmaceutical products (Bruhn *et al.*, 2012). One study suggests that brand attitude among airline passengers influences repurchase intention due to trust and brand love (Han *et al.*, 2019). Another suggests that brand attitude among fast moving goods positively impacts purchase intention due to corporate social responsibility (Ramesh *et al.*, 2019). There is likewise evidence that brand attitude stemming from commitment of a brand community has positive effects on purchase intention (Wang *et al.*, 2019) and that when generated by the redesign of brand logos positively influences loyalty and consumer repurchase intention (Rafiq *et al.*, 2020). This leads to the following hypothesis:

- H10. Brand attitude deriving from e-commerce platforms positively influences consumer purchase intention.

3. Research methodology

3.1 Data collection and sample

The data of this study were collected through a structured questionnaire designed with Le Sphinx IQ3 software. Prior to its dissemination, it was reviewed by a group of experts to ensure its comprehension. A multinational panel company was hired to disseminate the questionnaire online and collect the data. A nonprobabilistic purposive sampling approach was applied to select the e-commerce consumers. All participants provided consent in accordance with the company's privacy and consent policies and were guaranteed anonymity. Two filter queries ("Do you buy through e-commerce platforms?" and "Please, indicate the platform on which you buy most frequently") were posed at the outset of the questionnaire to ensure that they make e-commerce purchases and guarantee their consistency and veracity. A control question was also introduced to identify and discard automatic responses. Participants were asked to respond to the questions based on the e-commerce platform they use most often.

Information was collected from a total of 1,520 e-commerce platform consumers. However, the study finally retained 835 as many of the candidates did not meet the pre-established requirements. The final study population was broken down into 438 females (52.45%), 386 males (46.23%) and 11 of unidentified gender (1.32%). Most ranged in age from 25 to 54 (65.51%), a majority (64.43%) benefited from a higher education (undergraduate, master's or doctoral degree) and 60% were employed by others. Finally, as for their online purchasing habits, 41.56% acquired products at least once a week and 42.75% at least once a month. Table 1 lists their demographic profiles.

3.2 Measurement scales

A series of scales published in the specialized literature were adapted to accurately measure the different variables proposed in the model (Table 2), notably several seven-point Likert scales with the value of 1 corresponding to "totally disagree" and 7 to "totally agree." Information quality was measured by six items and information quantity by a three-item scale adapted from Zhang *et al.* (2014). Source credibility was assessed by a four-item scale adapted from Cheung *et al.* (2008). The emotions of pleasure, arousal and dominance, associated respectively with five, four and four items, were

Table 1 Summary of the profiles of the respondents

Characteristics	Frequency	%
Gender		
Female	438	52.45
Male	386	46.23
Other	11	1.32
Age		
18–24	98	11.74
25–34	195	23.35
35–44	197	23.60
45–54	155	18.56
55 and above	190	22.75
Education		
Primary and secondary education	297	35.57
Higher education	538	64.43
Occupation		
Employed	501	60
Self-employed	95	11.38
Unemployed	138	16.52
Retired	86	10.30
Other	15	1.80
Frequency of purchase		
At least once a week	347	41.56
At least once a month	357	42.75
At least once every three months	17	2.04
At least once every six months	32	3.83
At least once a year	82	9.82
Source(s): Authors' own work		

evaluated with scales adapted from Mehrabian and Russell (1974) and Hsieh *et al.* (2021). Brand attitude was measured by five items adapted from Wang *et al.* (2019). Finally, purchase intention was assessed by a four-item scale adapted from that proposed by Sullivan and Kim (2018).

3.3 Data analysis

A confirmatory factor analysis was carried out to confirm the reliability and validity of the psychometric properties of the scales. This required examining several global goodness-of-fit indices to compare them with the values recommended by the specialized literature (Hair *et al.*, 2010).

The discriminant validity was assessed using the Fornell and Larcker (1981) criterion. This requires that the square root of the mean variance extracted from each construct be greater than the correlations between constructs. This criterion was tested with a matrix whose diagonal reflected the values of the square root of the average variance extracted (AVE) from each construct and the values outside the diagonal corresponding to the correlations between the constructs.

After verifying that the measurement model met the established criteria, the study applied the covariance-based structural equation model (SEM) to test the hypotheses through the maximum likelihood estimation method.

Both the confirmatory factor analysis and the estimation of the SEM were carried out using Amos software.

4. Results

4.1 The measurement model

The results of the confirmatory factor analysis indicate that the standardized coefficients obtained were above the suggested limit of 0.70, thus statistically significant ($p < 0.01$). The individual reliability (R^2) of each indicator also attained values above the 0.50 recommended by the literature (Li *et al.*, 2013). The Cronbach's α , composite reliability (CR) and AVE values also surpassed those recommended (respectively, 0.70, 0.70 and 0.50) ensuring that the scales were adequate in terms of reliability and convergent validity. Likewise, the indicators of goodness of fit of the measurement model ranged within the limits of those determined by the literature, that is, values of incremental fit very close to 1 with the SB chi-square (d.f.) at 1,867.007 (532) and an RMSEA value at less than 0.08 (Hair *et al.*, 2010; Li *et al.*, 2013). Table 3 lists the results of the confirmatory factor analysis.

Table 4, in turn, lists the discriminant validity matrix where the values of the diagonal (square root of the AVE from each construct) surpass those under the diagonal (correlations between the constructs), confirming the differences between the analyzed constructs (Fornell and Larcker, 1981).

4.2 Structural model

Observations during the estimation of the SEM indicate that the value obtained from the Satorra-Bentler chi-squared test (2,214.576, d.f.: 541) was not significant as it depended on the size of the sample (Hair *et al.*, 2010). This situation led to evaluating the normed chi-square indicator ($\chi^2/d.f.$), a task consisting of analyzing the discrepancy between the degrees of freedom whose suggested level was a value less than 5 (Arbuckle and Wothke, 1999), reflected in the analysis by the value of 4.093. The evaluation of the global indicators likewise points to a good overall fit of the model: CFI = 0.922, NFI = 0.900, TLI = 0.914, IFI = 0.922 and RMSEA = 0.061. The results of the estimation of the model proposed here are depicted in Figure 1.

H1a–H1c propose a direct and positive relationship between the quality of the information on the emotions of pleasure, arousal and dominance, respectively. Although the nonsignificant parameter ($\beta_{QL \rightarrow PL}$: 0.099; $p > 0.05$) does not allow confirming that the quality of the information has positive effects on pleasure, the results do corroborate its positive and significant effects on arousal ($\beta_{QL \rightarrow AR}$: 0.417; $p < 0.001$) and dominance ($\beta_{QL \rightarrow DM}$: 0.181; $p < 0.01$), thus confirming H1b and H1c, but not H1a. This indicates that the quality of information measured by informativeness and persuasiveness is not relevant to consumer enjoyment. This result appears reasonable as there may be other signals requiring less effort from consumers that heighten the enjoyment of the purchase process. Evaluating the quality of the information requires great efforts among consumers, which renders the quality of the reviews irrelevant to their enjoyment.

H2a–H2c suggest a direct and positive relationship as to the quantity of information linked to the emotions of pleasure, arousal and dominance. The findings support that the amount of information positively and significantly influences pleasure ($\beta_{QN \rightarrow PL}$: 0.190; $p < 0.001$) and dominance ($\beta_{QN \rightarrow DM}$: 0.377; $p < 0.001$). However, the results do not allow to affirm that

Table 2 List of the items serving for the measurements

Construct	Items
Information quality	When I buy a product, the comments found on the platform about it provide comprehensive information When I buy a product, the comments found on the platform about it are accurate When I buy a product, the arguments of the comments found on the platform about it are convincing When I buy a product, the arguments of the comments found on the platform about it are persuasive When I buy a product, the arguments of the comments found on the platform about it are substantiated When I buy a product, the arguments of the comments found on the platform about it are solid
Information quantity	When I buy a product on the platform, I notice that many people post comments about it When I buy a product on the platform, I notice that it has attracted comments with positive ratings When I buy a product on the platform, I notice that it is very popular
Source credibility	In general, I find that people who leave comments know how to assess the quality of products In general, I find that people who leave comments are experts in evaluating the quality of products In general, I find that people who leave comments are trustworthy In general, I find that people who leave comments are reliable
Pleasure	When I use the e-commerce platform, I feel happy When I use the e-commerce platform, I feel satisfied When I use the e-commerce platform, I feel pleased When I use the e-commerce platform, I feel hopeful When I use the e-commerce platform, I feel relaxed
Arousal	When I use the e-commerce platform, I feel frenzied When I use the e-commerce platform, I feel jittery When I use the e-commerce platform, I feel wide awake When I use the e-commerce platform, I feel aroused
Dominance	While using this e-commerce platform, I feel like I am influential While using this e-commerce platform, I feel like my actions decide what kind of experience I have While using this e-commerce platform, I feel like I have a lot of control over my user experience While using this e-commerce platform, I feel like I can freely choose what I want to see
Brand attitude	In general, I think the brand of the product I want to purchase via the e-commerce platform is good In general, I think the brand of the product I want to purchase via the e-commerce platform gives me a good feeling In general, I think the brand of the product I want to purchase via the e-commerce platform is pleasant In general, I think the brand of the product I want to purchase via the e-commerce platform is valuable In general, I think the brand of the product I want to purchase via the e-commerce platform is trustworthy
Purchase intention	If I had to buy a product again, I would probably do it via this e-commerce platform I would like to use this e-commerce platform for my next purchase I intend to revisit this e-commerce platform in the future I would like to visit this e-commerce platform again to purchase products in the near future

Source(s): Authors' own work

information quantity has a positive and significant impact on arousal ($\beta_{QN \rightarrow AR}$: -0.081 ; $p > 0.05$). Hence, the results validate *H2a* and *H2c*, but not *H2b*. This nonsignificant effect suggests that the number of reviews of a platform does not activate, stress or incite alert among consumers and thus does not provoke arousal. There are probably other signals, not analyzed here, that induce greater arousal and make the consumer more suspicious.

H3a–H3c establish a positive and significant relationship between source credibility and the emotions cited above, which corroborates the three hypotheses and demonstrates that source credibility positively and significantly influences pleasure ($\beta_{SC \rightarrow PL}$: 0.459 ; $p < 0.001$), arousal ($\beta_{SC \rightarrow AR}$: 0.326 ; $p < 0.001$) and dominance ($\beta_{SC \rightarrow DM}$: 0.200 ; $p < 0.001$).

On the other hand, *H4–H6* propose that pleasure positively influences brand attitude, arousal negatively influences brand

attitude and dominance positively influences brand attitude. The findings clearly indicate that pleasure and dominance positively affect brand attitude, thus confirming *H4* ($\beta_{PL \rightarrow BA}$: 0.349 ; $p < 0.001$) and *H6* ($\beta_{DM \rightarrow BA}$: 0.550 ; $p < 0.001$). However, they do not demonstrate that arousal is a determinant of brand attitude and that it does not reflect any significant relationship ($\beta_{AR \rightarrow BA}$: 0.050 ; $p > 0.05$), thus not confirming *H5*. This suggests that arousal in the e-commerce context is irrelevant to whether the consumer is predisposed either positively or negatively toward a brand. The main reason may stem from the amount of experience that online consumers have on the platform where the shopping process does not require a continuous alert, a situation that neither draws customers closer or farther to a brand. Moreover, there may be other organisms involved in this avoidance or approach such as experience with the brand or brand equity.

Table 3 Convergent validity and reliability of constructs of the measurement model

Construct	Item	Standardized factor loading (<i>t</i> -value)	<i>R</i> ²	CR	AVE	Cronbach's α
Information quality	QL1	0.740*	0.548	0.909	0.627	0.908
	QL2	0.753 (21.906)	0.567			
	QL3	0.857 (25.220)	0.734			
	QL4	0.747 (21.730)	0.559			
	QL5	0.808 (23.654)	0.653			
	QL6	0.837 (24.592)	0.701			
Information quantity	QN1	0.823*	0.677	0.856	0.665	0.855
	QN2	0.797 (25.026)	0.635			
	QN3	0.826 (26.073)	0.682			
Source credibility	SC1	0.775*	0.601	0.905	0.705	0.901
	SC2	0.760 (23.399)	0.577			
	SC3	0.898 (28.811)	0.807			
	SC4	0.915 (29.416)	0.837			
Pleasure	PL1	0.869*	0.755	0.921	0.700	0.917
	PL2	0.881 (34.919)	0.776			
	PL3	0.886 (35.347)	0.786			
	PL4	0.769 (27.436)	0.591			
	PL5	0.768 (27.384)	0.590			
Arousal	AR1	0.859*	0.737	0.879	0.645	0.877
	AR2	0.805 (27.297)	0.647			
	AR3	0.729 (23.746)	0.532			
	AR4	0.815 (27.799)	0.664			
Dominance	DM1	0.736*	0.542	0.835	0.558	0.833
	DM2	0.733 (20.121)	0.537			
	DM3	0.722 (19.802)	0.521			
	DM4	0.795 (21.787)	0.633			
Brand attitude	BA1	0.798*	0.637	0.898	0.639	0.898
	BA2	0.815 (26.079)	0.664			
	BA3	0.812 (25.949)	0.659			
	BA4	0.789 (24.992)	0.622			
	BA5	0.782 (24.716)	0.611			
Purchase intention	PI1	0.818*	0.669	0.893	0.676	0.893
	PI2	0.845 (27.811)	0.714			
	PI3	0.791 (25.502)	0.626			
	PI4	0.835 (27.369)	0.696			

Note(s): *Value not calculated because the parameter was established at 1 to set the scale for the latent variable. $SB-\chi^2$ (d.f.) = 1,867.007 (532); RMSEA = 0.055; NFI = 0.915; TLI = 0.930; CFI = 0.938; IFI = 0.938

Source(s): Authors' own work

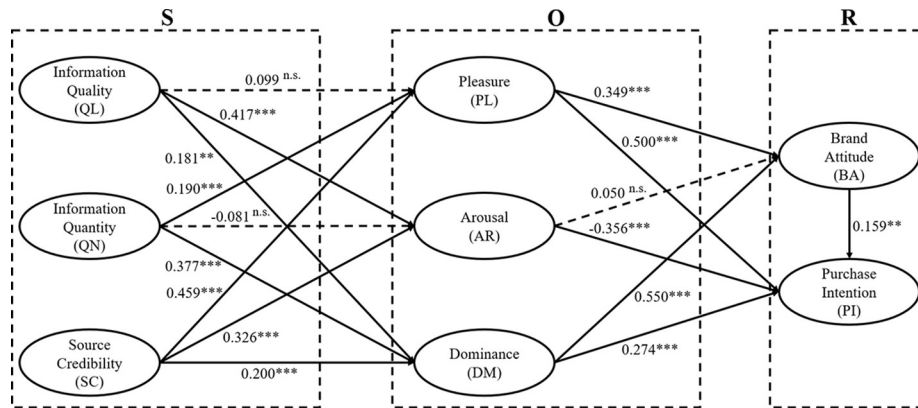
Table 4 Descriptive statistics and correlation matrix

Construct	Mean	SD	QL	QN	SC	BA	PI	PL	AR	DM
QL	5.082	1.161	<i>0.792</i>							
QN	5.519	1.109	0.764	<i>0.815</i>						
SC	4.598	1.357	0.766	0.675	<i>0.840</i>					
BA	5.697	0.932	0.665	0.642	0.630	<i>0.799</i>				
PI	5.814	1.104	0.269	0.372	0.356	0.557	<i>0.822</i>			
PL	5.208	1.259	0.578	0.549	0.646	0.708	0.569	<i>0.836</i>		
AR	3.902	1.686	0.595	0.442	0.577	0.463	0.135	0.600	<i>0.803</i>	
DM	5.643	1.069	0.591	0.610	0.551	0.761	0.598	0.744	0.457	<i>0.747</i>

Note(s): $n = 835$. Diagonal elements in italics correspond to the square root of AVE for each construct and the elements below the diagonal represent correlation estimates

Source(s): Authors' own work

Figure 1 Estimated structural equation model



Note(s): * $p < 0.05$; ** $p < 0.01$ and *** $p < 0.001$; n.s.: nonsignificant
 Source: Authors' own work

H7 likewise proposes that pleasure positively influences purchase intention, H8 that arousal negatively affects it and H9 that dominance positively influences it. The results allow confirming H7–H9 as they reveal the positive and significant impact of pleasure ($\beta_{PL \rightarrow PI}$: 0.500; $p < 0.001$), the negative and significant effect of arousal ($\beta_{AR \rightarrow PI}$: -0.356; $p < 0.001$) and the positive and significant influence of dominance ($\beta_{DM \rightarrow PI}$: 0.274; $p < 0.001$) on purchase intention.

Finally, the results confirm H10 as they reveal that attitude toward a brand has a positive and significant effect on purchase intention ($\beta_{BA \rightarrow PI}$: 0.159; $p < 0.01$).

Table 5 lists the results of the tests of the study hypotheses.

5. Discussion

5.1 General discussion

The aim of this study is to explore brand attitude and purchase intention related to e-commerce platforms through the emotions

experienced subsequent to perceiving a series of atmospheric cues. To do so, this research resorted to the S-O-R model where information quality, information quantity and source credibility act as stimuli. Pleasure, arousal and dominance serve as organisms in the model, while brand attitude and purchase intention as responses. The results demonstrate that the quality of the reviews positively influence arousal and dominance, but not pleasure. This positive and significant result corroborates previous research on the relationship between information quality, arousal and dominance (Hsieh et al., 2021; Liu et al., 2019; Ruiz-Mafe et al., 2020).

The lack of significance between information quality and pleasure opposes the findings of previous research that information quality increases consumer pleasure (Habib and Qayyum, 2018; Lamis et al., 2022; Liu et al., 2024). Information quality presumably does not prompt pleasure due to the cognitive effort required to process it, which generates arousal. In addition, as the quality of information is measured by informativeness and persuasiveness, consumers can perceive

Table 5 Results of hypotheses testing

Hypothesis	Relationship	Path coefficient	t-statistic	Supported
H1a	Information quality → pleasure	0.099 ^(n.s.)	1.630	No
H1b	Information quality → arousal	0.417***	6.116	Yes
H1c	Information quality → dominance	0.181**	2.728	Yes
H2a	Information quantity → pleasure	0.190***	3.529	Yes
H2b	Information quantity → arousal	-0.081 ^(n.s.)	-1.383	No
H2c	Information quantity → dominance	0.377***	6.280	Yes
H3a	Source credibility → pleasure	0.459***	8.752	Yes
H3b	Source credibility → arousal	0.326***	5.857	Yes
H3c	Source credibility → dominance	0.200***	3.658	Yes
H4	Pleasure → brand attitude	0.349***	10.230	Yes
H5	Arousal → brand attitude	0.050 ^(n.s.)	1.582	No
H6	Dominance → brand attitude	0.550***	13.388	Yes
H7	Pleasure → purchase intention	0.500***	11.431	Yes
H8	Arousal → purchase intention	-0.356***	-9.573	Yes
H9	Dominance → purchase intention	0.274***	5.103	Yes
H10	Brand attitude → purchase intention	0.159**	2.716	Yes

Note(s): * $p < 0.05$; ** $p < 0.01$ and *** $p < 0.001$; n.s.: nonsignificant

Source(s): Authors' own work

a persuasive intent which would lead information quality to be irrelevant to the enjoyment of the purchase process as consumers may view the information as insincere (Ryu, 2024). A moderating factor that could explain this nonsignificance is consumer experience as those with more experience in purchasing brand products on platforms consider the information disseminated by others to be irrelevant, thus diminishing their enjoyment of the purchase process. They will, in fact, prefer to rely on other signals such as whether the product forms part of top trends or weekly wonders.

The current findings also suggest that information quantity positively influences pleasure and dominance, but not arousal. Positive and significant effects related to information quantity, pleasure and dominance are in accordance with the conclusions of other investigations (Hsieh *et al.*, 2021; Richard and Chebat, 2016). The lack of significance in the relationship between the amount of information and arousal contradicts the findings concerning increased alertness, stress and nervousness generated by information overload (Chang *et al.*, 2018; Massara *et al.*, 2010; Menon and Kahn, 2002). This nonsignificant result does concur with the conclusions of the study by Bufquin *et al.* (2020) that also detected a significant relationship between the amount of information and stress. This could be due to the fact that stress does not derive from the amount of information, but from its length, which requires a greater cognitive effort.

This study thus bolsters the notion that source credibility positively influences pleasure, arousal and dominance. This finding linking source credibility with pleasure and arousal, in line with previous work (Chang *et al.*, 2018; Liu *et al.*, 2024), may be due to the greater the credibility of the source, the greater the feeling of dominance and pleasure during the purchase as the consumer deems the reviews to be truthful. However, e-commerce information asymmetry can provoke consumer uncertainty and alertness as to the credibility of reviews. Consumers when identifying a review crafted by an influencer tend to reduce their trust and cease searching and reading reviews (Gamage and Ashill, 2023). If consumers identify the source of the review as credible, they may nonetheless remain in a state of constant alert so as to judge the veracity of the evaluations. This process requires a great cognitive effort prompting a heightened state of stress. Consumers may also experience pleasure when they finalize their judgment and identify the source as credible.

The present results, also in line with those of certain investigations, reveal that positive emotions such as pleasure and dominance can be positively associated with brand attitude (Kirkby *et al.*, 2023; Scott *et al.*, 2022). This implies that happiness is one of the essential elements in maintaining a good consumer/brand relationship (Schreuder *et al.*, 2024). This idea coincides with other conclusions suggesting that pleasure positively influences attitudes toward items, such as a website (Laroche *et al.*, 2022; Richard and Chebat, 2016). Hence, attitude toward brands comprises both cognitive and affective components, a notion already advanced by Brown *et al.* (1998).

The nonsignificant effect of arousal on brand attitude follows the line of research stating that nonsignificant impact on attitude toward destination (Li *et al.*, 2018) and attitude toward advertising (Kim *et al.*, 2020). This suggests, depending on the object toward which the attitude is directed, that arousal may or may not be relevant. In the case of brand attitude, the results

here reinforce that a lack of significance can be explained by consumers' previous experience with the brand. This renders arousal irrelevant as brand experience eliminates the fear of the unknown during an online purchase.

The new evidence gleaned here reveals the positive and significant effect of pleasure and dominance on consumer purchase intention, an idea consistent with previous work (Bues *et al.*, 2017; Chang *et al.*, 2018; Xu *et al.*, 2025; Yang *et al.*, 2020). This finding reflects a highly negative relationship between arousal and purchase intention, which likewise echoes the results of other studies (Ghosh *et al.*, 2024; Jang and Namkung, 2009; Koo and Lee, 2011). While arousal is not relevant in yielding brand avoidance, it does increase consumer purchase intention. This may be due to the fact that while attitude toward a brand may depend, among other aspects, on consumer experience, purchase intention may be directly linked to a negative emotion experienced at that very moment yielding anxiety or nervousness, which may halt the purchase.

The current results also reveal that brand attitude elicits higher purchase intention. This follows the line of certain analyses that suggest that it is a key determinant to purchase intention (Bruhn *et al.*, 2012; Han *et al.*, 2019; Ramesh *et al.*, 2019; Tseng and Wang, 2023; Wang *et al.*, 2019).

Finally, the results address several gaps in research and offer insight into which social cues influence pleasure, arousal and dominance, and how these three emotions impact brand attitude and purchase intention. To date, the effect of certain social cues remains unexplored, notably the effect of quantity and quality of information on these three emotions, as well as the impact of the three on brand attitude.

5.2 Theoretical implications

This study comprises several theoretical implications. It is one of the first to combine the S-O-R theory with the pleasure-arousal-dominance model in the framework of how consumers generate brand attitude. It examines how e-commerce consumers from the standpoint of three emotions (pleasure, arousal and dominance) come to decisions after perceiving different signals, notably quality and quantity of information, and source credibility.

This investigation is likewise one of the first to explore how certain social atmospheric cues can act as stimuli influencing emotions as it identified source credibility as the most influential social signal affecting pleasure, information quality as the most influential affecting arousal and information quantity as the most affecting dominance.

A noteworthy aspect identified here distinguishing it from other e-commerce research is that it not only takes into account the emotions of pleasure and arousal, but that of dominance, which it places at the same hierarchical level. Recognizing dominance in the model highlights its importance in e-commerce research as it reinforces brand attitude and purchase intention. Dominance when analyzing emotions, in fact, cannot be disregarded when applying the S-O-R model, a notion advanced by Hsieh *et al.* (2014) and Mazaheri *et al.* (2014).

Applying the three emotions to the analysis confirms their impact on brand attitude and purchase intention, especially since arousal is considered negative rather than positive (Hsieh *et al.*, 2021). This study thus demonstrates that arousal experienced by the consumer during the online shopping process is negative and dampens purchase intention.

This analysis thus expands knowledge on the social signals available on the platforms that can generate emotions among consumers that ultimately induce purchase behavior. They are emotions that can lead to approach or avoidance depending on whether they are positive such as pleasure and dominance, or negative such as arousal.

5.3 Managerial implications

This study highlights the importance of emitting atmospheric signals in e-commerce, an aspect that has implications for professionals or vendors resorting to these platforms. Specifically, it identifies which signals are necessary for brands to gain favorable emotional attitudes that prompt consumer purchase intention. Information quality, for example, does not generate consumer pleasure. To increase sales, practitioners must therefore focus on improving and delivering additional signals such as information quantity and source credibility.

The results suggest that source credibility along with information quantity serve to generate consumer pleasure, which in turn promotes a positive attitude toward the brand and purchase intention. Thus, e-commerce professionals should encourage more consumer comments as these bolster pleasure and purchase intention. Many platforms have increased the number of reviews by offering incentives. Platforms could implement gamification strategies based on rewards or promotional incentives to encourage consumer interaction and the posting of credible reviews. These initiatives would strengthen trust and engagement, reduce information asymmetry about a product or brand and lead the electronic platform to resemble more a physical store where consumers can take part in proper dialogues with other buyers.

Professionals must also take into account source credibility of published reviews due to their strong positive impact on pleasure. This implies that marketers should prioritize authentic, consumer-generated reviews, and implement mechanisms to differentiate real reviews from those of promotional nature. In this way, consumers who are wary of the message will feel less alert or stress, and experience enjoyment during purchasing processes, which promotes a greater sense of control due to access to more information.

E-commerce professionals should also strive to reduce consumer stress stemming from information asymmetry due to the difficulty of testing products and interacting with the vendor through a monitor. These platforms should implement mechanisms rendering online transactions closer and warmer to alleviate nervousness. Information quality and source credibility are two key environmental stimuli that increase consumer alertness. Hence, marketers should adopt tools to identify genuine from promoted consumers to facilitate trust in the source. In order for consumers to easily detect quality information, and suffer less stress (prompting rejection), platforms should allow a filtering of reviews according to quality criteria and incentivize users through rewards to rate or provide useful content. In this way, potential consumers can directly access relevant information about the product or brand without expending cognitive efforts in identifying the quality of reviews.

Another aspect highlighted here is the relevance of the amount of information, followed by its quality and source credibility, in generating the emotion of dominance among consumers. Professionals should encourage the publication of quality reviews through mechanisms that reinforce credibility

such as including data on the number of purchases or product photos. This would also serve to reduce information asymmetry, yielding a greater sense of control among consumers, an effect that favors the platform by improving brand attitude and purchase intention.

In short, professionals should promote the publication of informative reviews on e-commerce platforms and provide consumer information without violating their privacy. Credibility is key as it generates pleasant emotions and dominance that improve brand attitude and increase purchase intention. Professionals should likewise reduce consumer nervousness or alertness, factors that negatively affect purchase intention. All improvements serving to achieve better information quality, information quantity and source credibility will decrease negative effects of arousal and foster positive favorable behavioral emotions and attitudes toward brands sparking higher purchase intention.

5.4 Limitations and future research

This study, like similar ventures, is handicapped by certain limitations. The first is that the sample was collected by a consumer panel company and could potentially suffer from bias despite its questionnaire containing control and filter questions. Certain participants were also possibly not truthful in their responses and some queries may have been either misunderstood or answered randomly. Another drawback is that it did not focus on a single or group of electronic platforms. The participants, in fact, referred openly to the purchase platform they use most frequently, and their responses were ultimately based on their experience. It would be of interest to apply this model to a single platform as this would yield more precise results as to how quality signals act among specific e-commerce platforms.

It is also noteworthy that not all e-commerce consumers perceive the signals in the same way and that these differences can provoke dissimilar behaviors. This aspect, not explored here, is a compelling line of future research that could cast light on potential differences according to their degree of involvement or participation.

Finally, future work on e-commerce could apply this model to purchase intention based exclusively on data gathered from social networks as purchasers can easily access not only this information but that of reviews by other consumers. This would allow exploring the impact of new emerging social signals such as gamification, virtual reality or live streaming that are transforming digital shopping experiences.

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