# Web design and its effect on key variables associated with online consumer behavior in the retail sector

**Elizabeth Emperatriz García-Salirrosas[a*], Rafael Fernando Rondon-Eusebio[b] and Dany Yudet Millones-Liza[c]**

[a]Faculty of Management Science, Universidad Autónoma del Perú, Peru
[b]Department of Humanities, Universidad Privada del Norte, Peru
[c]UPG Ciencias Empresariales, Escuela de Posgrado Universidad Peruana Unión, Peru

| CHRONICLE | ABSTRACT |
|---|---|
| | This study examines the effect of web design on the generation of electronic word of mouth (E-WOM) through the satisfaction of e-commerce consumers in the retail sector. To this end, three main objectives were proposed: (1) Evaluate the effect of web design on the perception of security, perceived enjoyment, perceived usefulness and perceived risk of the e-commerce consumer in the retail sector; (2) Evaluate the effect of customer service, perception of security, perceived enjoyment and perceived usefulness on consumer satisfaction in e-commerce in the retail sector; and (3) Explain the positive effect of customer satisfaction and the negative effect of perceived risk on the generation of E-WOM. A study was carried out using a quantitative approach with a non-experimental and cross-sectional design. Through non-probabilistic convenience sampling, a total of 422 questionnaires from consumers in the retail sector were collected. A partial approach was used to analyze the data. Least Squares PLS-SEM by using SmartPLS. The results show the significant positive effect of web design on the perceptions of security, customer service, and customer satisfaction. And a negative effect on risk perception. Furthermore, this study revealed the mediating effects of risk perception, security perception, and quality of customer service in the retail sector. This study has theoretical, practical, social, and customer management implications, so it will be useful in academic, social, and business areas. The results show the positive and significant effect of web design on the perception of security, enjoyment, and usefulness of online shopping. The negative and significant effect of web design on risk perception was also demonstrated; furthermore, this study revealed the positive and significant effect of perceived usefulness, enjoyment, security, and electronic service on customer satisfaction in online shopping. Finally, the negative and significant effect of risk perception on the generation of electronic word of mouth and the positive and significant effect of satisfaction on the generation of electronic word of mouth were demonstrated. |
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## 1. Introduction

Retail e-commerce is a business model for selling goods and services through the web or mobile applications. This type of commerce has experienced high growth in recent years, increasing by 19% in 2021 compared to the previous year (Orús, 2022). Due to the arrival of the COVID-19 pandemic, the purchasing trend to mitigate infections was carried out through the use of electronic platforms. This is how statistics indicate that 90% of the world's population had purchased online, which indicates that retail e-commerce is an important economic activity; therefore, in 2021, the monetary value of retail e-commerce

was approximately 4.9 trillion dollars, which has led many companies to increase their online presence and experience high growth in their sales (Orús, 2022). Retail e-commerce is an increasingly popular way to buy and sell goods and services, and is expected to continue growing in the future.

In particular, retail companies have experienced different situations during the pandemic, so they have seen this as an opportunity to engage with technology, while others have faced economic imbalances due to a lack of innovation (García-Salirrosas et al., 2023; García-Salirrosas et al., 2022). Now, companies that got involved with technology had to face new challenges, among them, the need to automate processes to optimize their efficiency. In this process, web criteria have been developed to satisfy user preferences and provide a personalized experience (Garcia-Salirrosas & Rondon-Eusebio, 2022; Thisarani & Manjusri, 2023). From this idea, responsive websites stand out, referring to those sites that adapt to any type of screen to access content regardless of the size of the device, which play an important role in the growth of electronic commerce, having a high impact on user satisfaction (Almeida et al., 2023).

To have a more complete vision of web design, designers rely on certain usability rules in order to offer a satisfactory and effective experience to the user, some of these rules include clear and coherent navigation, with a unique visual hierarchy and legibility of the content, these characteristics being those that increase the probability of having a greater number of visitors to the website (Vecino et al., 2022). In general terms, dealing with web design is dealing with a crucial factor in the user experience within electronic commerce, its graphic interface generates a high impact on the visual attention of customers during online purchases, achieving in some cases the retention of these and causing their continuous use, this is how it is stated that the website is a determining factor to satisfy the customer, allowing this feeling of satisfaction to drive them to recommend the products and/or services of a company (Modi & Singh , 2023; Yu-jung & Huang-Hua, 2023; Ginting et al., 2023).

Now, considering that customer satisfaction is an important variable for the success of any business, and in electronic commerce, web design can also be a determining factor in customer satisfaction, it is important to highlight that the relationship between a design website and customer satisfaction may be mediated by other factors, such as risk perception, security, and customer service. Regarding risk perception, this is described as the subjective perception that individuals have about the possibility of suffering some type of damage or loss as a result of an action (Yuniarti et al., 2022). Furthermore, they indicate that ethical standards are more likely to be violated during an electronic transaction compared to a direct purchase, which decreases repurchase intention.

As recorded in the literature, the retail e-commerce sector has been exposed to risks for many years. In response to this statement, various studies concluded that perceived risk is an obstacle to the use of online shopping, which makes consumers fear the possible negative consequences and are discouraged from completing online transactions, so this fear has led consumers to prefer physical stores instead of online shopping (Persad & Padayachee, 2015; Thakur & Srivastava, 2015). Under that same context, perceived risks act as barriers to successful online transactions, representing at the same time an important factor to consider for consumers thinking about purchasing online (Meng-Hsiang et al., 2014). Thus, customers with lower perceived risk prefer to shop online compared to those with higher perceived risk (Hsieh & Tsao, 2014).

Although the closure of businesses and the imposition of mobility restrictions have allowed the growing demand for online purchases, web design continues to be an important aspect that must be addressed so that consumers feel satisfied with the purchase made and initiate a recommendation word of mouth of the service received. Therefore, the purpose of this study is to examine the effect of web design on the generation of electronic word-of-mouth (E-WOM) through the satisfaction of e-commerce consumers in the retail sector. To this end, three main objectives were proposed: (1) Evaluate the effect of web design on the perception of security, perceived enjoyment, perceived usefulness, and perceived risk of the e-commerce consumer in the retail sector; (2) Evaluate the effect of customer service, perception of security, perceived enjoyment, and perceived usefulness on consumer satisfaction in e-commerce in the retail sector; and (3) Explain the positive effect of customer satisfaction and the negative effect of perceived risk on the generation of E-WOM. The study findings could be useful to online retailers to improve their web design and their focus on security, perceived enjoyment, perceived usefulness, perceived risk, and customer service, which could lead to greater online consumer satisfaction, improving the performance of a retail business.

To address this topic, after the introduction, section two of the article is presented, which deals with the literature review and hypotheses. The materials and methods are presented in Section 3; the results are presented in Section 4; in Section 5 the discussion, and finally, the conclusions, implications, limitations, and future research are presented in Section 6.

## 2. Literature Review and Hypotheses

### 2.1 Web design, perceived security, perceived risk, perceived enjoyment, and perceived usefulness

Web design is a process that consists of creating a virtual and functional interface in order to improve the user experience and achieve the objectives of a business; this being so, the design must be effective, efficient, satisfactory, and pleasant for the user. For this purpose, it is necessary to take into account the rules of web design, and that is that whoever designs it must

have critical thinking, a thought that allows us to cover a complex situation regarding human-computer interaction; in this way, the authors affirm that a web design, regardless of the virtual appearance, requires characteristics such as usability and accessibility (Armstrong, 2009; Everett, 2014). In this way, web design is highlighted as an essential tool within electronic commerce, since it is not only about making the website look visually attractive, but also about ensuring that online transaction processes are easy to follow and are designed to maximize their utility. For instance, there is a high likelihood that the customer won't complete the online purchases if the process sequence does not match the operations they need to carry out (Wang & Whag, 2009). In this way, it is crucial that web design consider the needs and expectations of the client, thus increasing the perception of credibility and security and thus promoting the user's purchase intention through an online shopping experience that is satisfactory, low-risk, and high-satisfaction, translating these facts into increased sales and customer loyalty (Ziółkowska, 2021). This being the case, it stands out that good web design can have a significant impact on the effectiveness of electronic commerce, so its importance in this area cannot be underestimated.

Although some studies claim that digital transformation has had a significant impact on electronic commerce, the way it reduces costs and enhances business procedures has revealed the potential of companies. Other studies have shown that web design has a positive effect on customer satisfaction because it makes purchases seem safer, which makes customers feel safe and ultimately leads to purchase loyalty (Yoo et al., 2023). According to scientific literature, websites optimize the consumer's purchase intention, increasing the usefulness of the information they possess; likewise, evidence has been found that demonstrates that good performance of a website meets customer expectations by employing privacy policies, customer service, and security in transactions that reduce perceived risk, so a secure payment mechanism, flexible and efficient keeps the customer satisfied, resulting in greater purchase intention (Jiang et al., 2015; Ying-Feng et al., 2013). To reinforce this statement, other studies have been identified that give special emphasis to certain characteristics that pave the way for a positive perception on the part of customers, these being: reliable information and high security when carrying out an economic transaction. (Afsar et al., 2013; Cardoso et al., 2022).

In this regard, one of the studies identified shows that web design also implies providing high security to the client, so it is important to evaluate the level of risk and security that they perceive (Beyari, 2020). Thus, it stands out that trust and security are key factors in the purchase intention, purchase behavior, and purchase decision of consumers, so security in each transaction plays a main role in the perception of risk. This is due to the lack of face-to-face interaction in online environments (Hajli, 2012). Therefore, a high level of security and the reduction of perceived risk can serve as powerful mechanisms for the development of trust and perceived enjoyment by consumers (Einwiller, 2003; Garcia-Salirrosas & Rondon-Eusebio, 2022). Of these factors, perceived usefulness is also an important element that can be influenced through website design. That is, a good web design can improve the customer's perception of the usefulness of the service offered, while a poor design can generate a negative impression about it. Therefore, it is essential that the website design be attractive, easy to navigate, and provides the necessary information in a clear and concise manner to provide a satisfactory experience, thus improving the quality of service perceived by the customer (Venkatakrishnan et al., 2023).

Furthermore, considering that the online shopping trend has become a new lifestyle, consumer behavior has also changed. Their inclination to save time, compare prices, and access special promotions has allowed them to explore the websites according to their interests (Hartanto et al., 2022). This is how online shopping, attributed to social distancing restrictions due to the pandemic, presented a rapid evolution, with it also a method of protection against cyber risks, thus providing security to consumers when purchasing (Warganegara & Hendijani, 2022), that security on the website is crucial to guaranteeing the protection of user data, and that individuals perceive a reliable website is a positive indicator that increases purchase intention. In other words, if a consumer perceives the existence of risk, they will immediately abandon the purchase, leaving them dissatisfied. Therefore, any strategy for the online shopping process must be appropriately designed in terms of security and protection, taking into account that any symptom of uncertainty created in the consumer's mind regarding their security could drastically nullify the interaction between the consumer and the company (Awad & Ragowsky, 2014; Nurjannah et al., 2022). Now, to test the reality presented in the Peruvian population, the following hypotheses are proposed:

**H₁:** *Web design has a positive effect on the consumer's perception of security in e-commerce in the retail sector.*

**H₂:** *Web design has a positive effect on the consumer's perceived enjoyment of e-commerce in the retail sector.*

**H₃:** *Web design has a positive effect on the consumer's perceived usefulness of e-commerce in the retail sector.*

**H₄:** *Web design reduces the consumer's perceived risk of e-commerce in the retail sector.*

*2.2. Perceived usefulness, perceived enjoyment, perceived safety, and consumer satisfaction*

Technological advances have ushered in many online commerce opportunities, thereby transforming the way businesses operate. In this way, the fields of engineering and marketing have developed various applications to offer companies' services and/or products, all of them through technological platforms, which deserve to be evaluated based on an integrative model such as utilitarian, hedonic, and social factors. Thus, the antecedents have evaluated this integrative model in order to determine consumer satisfaction (Wen & Prybutok, 2011). According to recent research, it is specified that there are various factors

that can affect the satisfaction of the e-commerce consumer, some of them being perceived usefulness, perceived enjoyment, and perceived security, and that online shopping applications have a certain particularity capable of influencing consumer perception (Liu & Napitupulu, 2020). To support these ideas, arguments have been found that risk perception is a cultural aspect that differs from one country to another, but in all cases, a high level of risk perception generates a negative effect on customer satisfaction (Carvache-Franco et al., 2022), and therefore affects purchase intention in electronic commerce. Therefore, it is necessary that companies that have adopted e-commerce can establish necessary strategies to increase security; this fact constitutes an increase in customer satisfaction and purchase intention within online environments (Habib & Hamadneh, 2021). Furthermore, it is necessary to take into account that electronic commerce has adopted the role of the backbone within businesses whose reach is global and that, in short, e-commerce has managed to combat the barriers of time and space. This free accessibility is a determining factor so that consumers can visit electronic spaces at any time, browsing the web with total confidence, which also generates consumer satisfaction (Gonzalez-Rodriguez et al., 2017).

From what was mentioned in the previous paragraphs, it is highlighted that perceived usefulness can improve the user experience, facilitating access to information and other relevant resources that can satisfy the user (Miao et al., 2022), thus allowing the client to receive good service. In this regard, Schmitt et al. (2013), associate the quality of customer service and customer satisfaction, emphasizing that when a company provides a customer-oriented online experience, it opens the possibility for them to have a positive experience, thus promoting satisfaction of e-commerce consumers in the retail sector and in short, technological development has been generating significant changes regarding the interaction of the company with the e- commerce consumer , which is why it is essential that each consumer can navigate safely , enjoying a positive experience regarding ease of use, perceived enjoyment and perceived usefulness that is capable of strengthening consumer satisfaction in e- commerce in the retail sector (Bhudiawan & Viany, 2022; Sastradi & Setiawati, 2021). Based on the above, the following hypotheses are proposed:

**H6:** *The perceived usefulness of using the website has a positive effect on consumer satisfaction in e-commerce in the retail sector.*

**H7:** *The perceived enjoyment of using the website has a positive effect on consumer satisfaction in e-commerce in the retail sector.*

**H8:** *The perceived security of the website has a positive effect on consumer satisfaction in e-commerce in the retail sector.*

**H9:** *Customer service has a positive effect on consumer satisfaction in the e-commerce retail sector.*

*2.3. Consumer satisfaction, perceived risk, and E-WOM*

Consumer satisfaction is considered one of the main aspects of business success. Customers' perceptions and assessments of the excellence and caliber of the delivery of goods and/or services within virtual environments make up this factor (Taan, 2019). Despite the fact that there are numerous studies that analyze customer perceptions in light of their needs, they all agree that online shopping generates different perceptions than physical shopping and that consumers' prior experiences have an impact on these perceptions (Tandiono et al., 2020). In this way, it is important that consumers can live a positive experience so that it is transmitted through E-WOM (electronic word-of-mouth marketing) (Purwanto et al., 2020), and there is evidence that shows that customer attitudes and perceptions can increase or decrease customer satisfaction. This being the case, it becomes a necessity that consumers can feel high security and low risk so that they can feel satisfied and encouraged to recommend the products and/or services (Belanche et al., 2022; Mutia et al., 2022).

Thus, online consumer satisfaction has a significant effect on electronic word-of-mouth marketing (E-WOM); therefore, it is important that companies dedicated to e-commerce can focus on improving the quality of customer service to promote online consumer satisfaction, thus encouraging them to share their positive experiences and recommend the services to their social circle (Saleh et al., 2015; Yang & Yuan, 2018). In general, these studies support the idea that customer satisfaction is a behavior that results from the perception of perceived quality and perceived risk, as well as the experience of other consumers (Arilaha et al., 2021; Wen & Prybutok, 2011; Zhou et al., 2019). And even though there are an increasing number of e-commerce consumers, there are still people who consider that making online purchases continues to be a source of risk, making this fact a serious problem in making decisions regarding purchases. online (Shu-Hsien et al., 2021). In this way, online retailers can improve customer satisfaction by reducing risks, considering that good customer service not only retains customers but also attracts new consumers in the e-commerce. retail sector. From these paragraphs, the following hypotheses are proposed:

**H5:** *The reduction of perceived risk increases the generation of E-WOM from e-commerce in the retail sector.*

**H10:** *Customer satisfaction has a positive effect on the generation of E-WOM in e-commerce in the retail sector.*
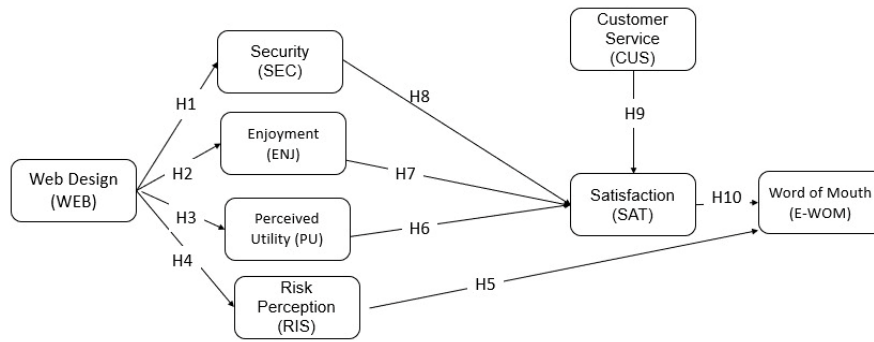
**Fig. 1.** Proposed theoretical model.

## 3. Materials and Methods

### 3.1. Context and method

The purpose of this study was to examine the effect of web design on the generation of electronic word of mouth (E-WOM) through the satisfaction of e-commerce consumers in the retail sector. To this end, three main objectives were proposed: (1) Evaluate the effect of web design on the perception of security, perceived enjoyment, perceived usefulness, and perceived risk of the e-commerce consumer in the retail sector ; (2) Evaluate the effect of customer service, perception of security, perceived enjoyment, and perceived usefulness on consumer satisfaction in e-commerce in the retail sector ; and (3) Explain the positive effect of customer satisfaction and the negative effect of perceived risk on the generation of E-WOM.

### 3.2. Sample and Procedure

In order to gather information for this study, non-probabilistic convenience sampling was utilized (Hair et al., 2013). To do so, a Google form was used to conduct an online survey, the link to which was disseminated through the WhatsApp messaging application. The survey was conducted in Lima, the Peruvian capital, between July 8 and August 27, 2023. The study focused mainly on retail e-commerce customers. That is why an inclusion criterion was those people who stated that they had made purchases through e-commerce in the retail sector during the last 6 months prior to the application of the survey for this study. Respondents were told that the survey was voluntary, that the data they provided would be used only for academic research, and that the analysis of the data would be done in an anonymous manner. It was possible to recover 422 in this manner. Of which, most participants were single, between the ages of 18 and 30, and had completed their university education (see Table 1).

**Table 1**
Sociodemographic data of the sample

| | Age and Gender | | | | | | |
|---|---|---|---|---|---|---|---|
| | Female | | Male | | Total | | |
| Age range | n | % | n | % | n | % | |
| 18 -30 | 170 | 40.3 | 154 | 36.5 | 324 | 76.8 | |
| 21 - 45 | Four. Five | 10.7 | 17 | 4.0 | 62 | 14.7 | |
| 46 -55 | 13 | 3.1 | 14 | 3.3 | 27 | 6.4 | |
| 56 - 67 | 3 | 0.7 | 6 | 1.4 | 9 | 2.1 | |
| | 231 | 54.7 | 191 | 45.3 | 422 | 100.0 | |

| Academic level | | | Civil status | | |
|---|---|---|---|---|---|
| | n | % | | n | % |
| academic | 244 | 57.8 | Single | 299 | 70.9 |
| Technical | 124 | 29.4 | Married or with a partner | 111 | 26.3 |
| Secondary | 54 | 12.8 | Divorced or widowed | 12 | 2.8 |
| | 422 | 100.0 | | 422 | 100.0 |

### 3.3. Measures

To develop this research model, scales have been used according to scientific literature, for example, to evaluate web design, the Usaweb scale has been used (García-Salirrosas & Millones-Liza, 2022). To evaluate risk perception, customer service, safety, and satisfaction, the e-RetailTest scale has been used (E. García-Salirrosas et al., 2023); to evaluate E-WOM, the work carried out by (Zeqiri et al., 2023); to evaluate enjoyment, the work carried out by Nguyen & Llosa (2023); and to evaluate perception of usefulness, it was adapted from the work carried out by Ruiz-Alba et al. (2022). The final questionnaire consisted of a total of 29 items, distributed to evaluate the 8 variables: website design (10 items), risk perception (4 items), security perception (3 items), customer service (3 items), satisfaction (2 items), enjoyment (2 items), perceived usefulness (2 items), and E-WOM (3 items). A Likert-type scale, with 1 denoting "completely disagree" and 5 denoting "completely agree," was used to evaluate each item. There were two sections to the digital questionnaire. The first section comprised 29 items pertaining to the assessment of consumers' attitudes towards electronic commerce in the retail sector, while the second section

consisted of questions aimed at gathering sociodemographic information about the participants, including age, sex, marital status, and educational attainment.

*3.4. Data analysis*

To test the hypotheses in the data analysis, partial least squares (PLS-SEM) was used. The PLS-SEM method can look at the connections between each variable in a conceptual model and a multivariate analysis with three or more variables at the same time. It is a complete method for multivariate statistical analysis. It includes both measurement and structural components. (Hair et al., 2013). Furthermore, the PLS-SEM was used in the present study because it facilitates theory construction (Hair et al., 2011). To perform the PLS-SEM analysis, SmartPLS (Version 4.0) was used. According to Kock (2014), this software was used because it lets you use different algorithms for the external and internal models when figuring out the scores of the latent variables, like the path coefficient and the parameters linked to the p-value. It also finds and takes into account non-linear relationships in the structural model (Kock, 2011).

## 4. Results

Evaluating a model using PLS-SEM is a two-step process that involves evaluating the measurement model and the structural model. An analysis of the constructs' validity and reliability is part of the measurement model assessment process. An assessment of the correlation between every variable and its corresponding components is part of this step; That is, the responses to each statement in the questionnaire are evaluated. Likewise, the evaluation of the structural model deals with the relationships between the constructs for the contrast of the model hypotheses (Chin, 2010; Hair et al., 2011) .

*4.1 Evaluation of the measurement model*

Convergent validity and construct reliability (internal consistency) evaluation are necessary to appraise reflective constructs. In order for convergent validity to be deemed appropriate, each indicator's loading needs to exceed 0.7 (Hair et al., 2011). Likewise, the composite reliability (CR) and Cronbach's alpha coefficient must be equal to or greater than 0.7. When a factor-based algorithm is used for the external model, Cronbach's alpha coefficient can be used to perform the reliability assessment, as it and CR tend to converge to similar values with a factor-based algorithm ( Kock, 2015).  Additionally, the average variance extracted (AVE) needs to be higher than the 0.5 threshold (Chin, 2010; Hair et al., 2011). Every element linked to the nine reflective constructs in this study, as indicated in Table 2, had a loading ranging from 0.774 to 0.964, and the constructs' Cronbach's alpha (α)  and composite reliability (Cr) were both greater than 0.8, indicating acceptable reliability. Additionally, it was noted that the constructs' AVE was higher than 0.6, indicating that the measurement model's convergent validity was appropriate.

**Table 2**
Evaluation outcomes from the measurement model

| Item | Loading | C.R. | α | AVE |
|---|---|---|---|---|
| WEB1 | 0.840 | | | |
| WEB2 | 0.858 | | | |
| WEB3 | 0.853 | | | |
| WEB4 | 0.867 | | | |
| WEB5 | 0.862 | 0.952 | 0.951 | 0.696 |
| WEB6 | 0.843 | | | |
| WEB7 | 0.830 | | | |
| WEB8 | 0.796 | | | |
| WEB9 | 0.790 | | | |
| WEB10 | 0.798 | | | |
| CUS1 | 0.920 | | | |
| CUS2 | 0.910 | 0.902 | 0.902 | 0.837 |
| CUS3 | 0.915 | | | |
| SAT1 | 0.964 | 0.922 | 0.920 | 0.926 |
| SAT2 | 0.961 | | | |
| RIS1 | 0.864 | | | |
| RIS2 | 0.890 | 0.917 | 0.916 | 0.799 |
| RIS3 | 0.910 | | | |
| RIS4 | 0.912 | | | |
| SEC1 | 0.934 | | | |
| SEC2 | 0.936 | 0.929 | 0.925 | 0.870 |
| SEC3 | 0.927 | | | |
| E-WOM1 | 0.907 | | | |
| E-WOM 2 | 0.922 | 0.860 | 0.838 | 0.757 |
| E-WOM3 | 0.774 | | | |
| ENJ1 | 0.943 | 0.871 | 0.870 | 0.885 |
| ENJ2 | 0.938 | | | |
| PU1 | 0.946 | 0.878 | 0.877 | 0.891 |
| PU2 | 0.941 | | | |

Cronbach's alpha ( α ) for all variables is >0.8, the composite reliability (CR) > 0.70, the mean-variance extracted (AVE) > 0.60; indicating a significant validity of the model.

Discriminant validity provides the extent to which each construct in the model is unique with respect to the others and the extent to which meaning overlaps are avoided in indicators that do not belong to multiple constructs (Chin, 2010; Kock, 2014). For every construct, the square root of the AVE should exceed the highest correlation found in the AVE model between that construct and other constructs (Hair et al., 2011). Table 3 demonstrates that the square root of the AVE for each construct was higher than the correlations between the constructs, suggesting that the discriminant validity of the model is acceptable.

**Table 3**
Discriminant Validity

|  | CUS | ENJ | PU | RIS | SAT | SEC | WEB | E-WOM |
|---|---|---|---|---|---|---|---|---|
| CUS | **0.915** |  |  |  |  |  |  |  |
| ENJ | 0.564 | **0.941** |  |  |  |  |  |  |
| PU | 0.481 | 0.756 | **0.944** |  |  |  |  |  |
| RIS | -0.460 | -0.565 | -0.534 | **0.894** |  |  |  |  |
| SAT | 0.645 | 0.785 | 0.746 | -0.528 | **0.962** |  |  |  |
| SEC | 0.654 | 0.617 | 0.570 | -0.503 | 0.672 | **0.933** |  |  |
| WEB | 0.758 | 0.731 | 0.687 | -0.594 | 0.792 | 0.715 | **0.834** |  |
| E-WOM | 0.490 | 0.596 | 0.603 | -0.650 | 0.618 | 0.585 | 0.631 | **0.870** |

Note: The square root of AVEs is shown diagonally in bold.

### 4.2. Structural model evaluation

Two initial criteria need to be verified in order to assess the structural model: (1) the path coefficients and (2) the endogenous constructs' R2 coefficient value. In the structural model, each hypothesis is linked to a causal link that illustrates the connections between two constructs. For every relationship in the model, path coefficients and corresponding p-values have been determined. The value of the R2 coefficient is primarily dependent on the research area, even though the path coefficients need to be significant. In this sense, values of 0.67 are suggested for substantial measures, 0.33 for moderate measures and 0.19 for weak R2 values (MG Chin, 1998) . In behavioral research, an R2 value of 0.2 is deemed appropriate (Hair et al., 2014; Kock, 2013) . In the present study, the R2 for SEC, ENJ, PU, RIS, SAT, and E-WOM were 0.511, 0.534, 0.471, 0.353, 0.731, and 0.527, respectively. Therefore, all R2 values had relatively high and acceptable levels.

The evaluation of the path coefficients and the results of the hypothesis tests are displayed in Table 4 and Fig. 2. The outcomes demonstrate the positive and significant effects of WEB on SEC (H1), ENJ (H2) and PU (H3). The negative and significant effect of WEB on RIS was also demonstrated (H4); Furthermore, this study revealed negative and significant effect of RIS on E-WOM (H5). Likewise, the positive and significant effect of PU on SAT (H6), ENJ on SAT (H7), SEC on SAT (H8) and CUS on SAT (H9) was demonstrated. Finally, the positive and significant effect of SAT on E-WOM was demonstrated (H10).
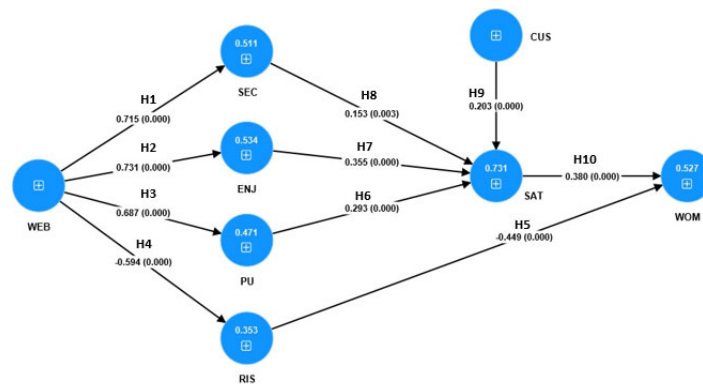


**Fig. 2.** Results of the structural model

**Table 4**
Results of hypotheses testing

| h | Hypothesis | Pat coefficient | T statistics | P values | Decision |
|---|---|---|---|---|---|
| H1 | WEB → SEC | 0.715 | 26,028 | 0.000 | Supported |
| H2 | WEB → ENJ | 0.731 | 25,321 | 0.000 | Supported |
| H3 | WEB → PU | 0.687 | 20,433 | 0.000 | Supported |
| H4 | WEB → RIS | -0.595 | 13,609 | 0.000 | Supported |
| H5 | RIS → E-WOM | -0.449 | 9,045 | 0.000 | Supported |
| H6 | PU → SAT | 0.293 | 5,627 | 0.000 | Supported |
| H7 | ENJ → SAT | 0.355 | 5,970 | 0.000 | Supported |
| H8 | SEC → SAT | 0.153 | 2,969 | 0.003 | Supported |
| H9 | CUS → SAT | 0.203 | 4,314 | 0.000 | Supported |
| H10 | SAT → E-WOM | 0.380 | 7,342 | 0.000 | Supported |

## 5. Discussion

The purpose of this study was to examine the effect of web design on the generation of electronic word of mouth (E-WOM) through the satisfaction of e-commerce consumers in the retail sector. To this end, three main objectives were proposed: (1) Evaluate the effect of web design on the perception of security, perceived enjoyment, perceived usefulness, and perceived risk of the e-commerce consumer in the retail sector; (2) Evaluate the effect of customer service, perception of security, perceived enjoyment, and perceived usefulness on consumer satisfaction in e-commerce in the retail sector; and (3) Explain the positive effect of customer satisfaction and the negative effect of perceived risk on the generation of E-WOM.

Regarding the previous statement, the literature review confirms that retail e-commerce has become an important economic activity on a global scale, particularly during the COVID-19 pandemic. This is because people around the world have increasingly relied on digital platforms to make purchases and reduce the transmission of the virus (Beckers et al., 2021; E. García-Salirrosas et al., 2022). According to estimates, the monetary value of retail e-commerce in 2021 was around \$4.9 trillion, which has led many companies to improve their online presence and witness significant sales growth (Orús, 2022). However, retail organizations that have implemented technology to improve their operational efficiency have encountered novel obstacles, such as the imperative to provide a personalized customer experience through responsive websites that support multiple screen sizes and meet specific usability criteria in order to guarantee unambiguous and uniform navigation (Thisarani & Manjusri, 2023). For this reason, web design is essential to capture customers' visual attention during online purchases, which can affect their happiness and likelihood of making future purchases (Almeida et al., 2023). However, there may be other additional factors that mediate the relationship between web design and customer satisfaction in retail e-commerce, such as perceived security, perceived enjoyment, perceived usefulness, risk perception, and customer service, among others. And all of them influence the development of word-of-mouth among e-commerce consumers. Just to take a few of these factors into consideration, users' confidence grows and they decide to make the purchase thanks to the sense of security that web design conveys (Qayyum et al., 2018). Likewise, the perception of risk in online purchases is high due to the possibility of suffering some type of damage or loss derived from the transaction, which could reduce the customer's repurchase intention (Meng-Hsiang et al., 2014; Persad & Padayachee, 2015; Yuniarti et al., 2022). Likewise, in terms of customer service, maintaining active communication by resolving doubts and advising on the purchasing process translates into greater satisfaction with the online experience and the possibility of recommending the virtual store to other consumers (Barusman, 2019; Kassim & Asiah Abdullah, 2010). When looking at how web design affects the spread of word-of-mouth through customer satisfaction in online shopping, it is important to take into account these factors: perceived security, perceived enjoyment, perceived usefulness, perceived risk, and perceived customer service. These factors would change the relationship between the two.

Before looking at the results, the measurement model was checked. It was found that each item related to its own construct had a loading between 0.774 and 0.964, and both the CR and Cronbach's alpha were greater than 0.8 in all cases, which means the reliability was good. Furthermore, it was found that the AVE of the constructs was greater than 0.6; therefore, the convergent validity of the measurement model was acceptable. Likewise, it was shown that the square root of the AVE for the constructs was greater than the correlations between them, which indicates that the model has acceptable discriminant validity. With these results, the structural model was evaluated, and it was found that the $R^2$ of the coefficients for SEC, ENJ, PU, RIS, SAT, and E-WOM were 0.511, 0.534, 0.471, 0.353, 0.731, and 0.527, respectively. Therefore, all $R^2$ values had relatively high and acceptable levels. The values from this study suggest that the study variables account for a high percentage of the variance in SAT and E-WOM. It was found that WEB had a positive and significant effect on SEC (H1), ENJ (H2), and PU (H3). This was shown by the hypothesis tests and the path coefficients. The negative and significant effect of WEB on RIS (H4) and the negative and significant effect of RIS on E-WOM (H5) were also demonstrated. Likewise, the positive and significant effect of PU on SAT (H6), ENJ on SAT (H7), SEC on SAT (H8), and CUS on SAT (H9) was demonstrated. Finally, the positive and significant effect of SAT on E-WOM was demonstrated (H10). Regarding the first objective, the results of this study support all the hypotheses and agree with the literature review and previous research, highlighting the importance of web design in electronic commerce. This is because it encompasses not only the aesthetics of a website, but also the seamless execution of online transactions, designed to increase customer satisfaction (Al-Kasasbeh et al., 2011; Belanche et al., 2012; Garcia-Salirrosas & Rondon-Eusebio, 2022). Furthermore, empirical data indicate that web design has a favorable impact on user enjoyment, trust, and satisfaction, which in turn positively influences buyer loyalty and word-of-mouth recommendation (Chakraborty et al., 2022; Gonzalez-Rodriguez et al., 2017; Saleem et al., 2022; Zhang et al., 2020). Furthermore, it is essential to convey a feeling of security to the consumer, since it is crucial to evaluate their perception of risk and security (Belanche et al., 2012). In this regard, multiple authors maintain that offering reliable and credible information that instills confidence when carrying out economic transactions online leads to higher levels of pleasure, which is why the design of websites is widely recognized as a very influential component when determining user satisfaction in this specific context (Al-Kasasbeh et al., 2011). Therefore, it is crucial that the website have an attractive design, user-friendly navigation, and present information directly and succinctly. This will ensure a good user experience and improve the perceived quality of the service.

The results of this study corroborate hypotheses H1, H2, H3, and H4 and coincide with the bibliographic review that highlights the importance of web design in electronic commerce. The reason for this is that web design not only involves the visual appeal of a website but also the efficient completion of online transactions, with the aim of increasing consumer happiness (Al-Kasasbeh et al., 2011; García-Salirrosas & Rondón-Eusebio, 2022). That is, a clear and substantial impact of web design (WEB) was observed on the perception of security (SEC) (H1), perceived enjoyment (ENJ) (H2), and perceived usefulness (PU) (H3). This result is aligned with other research suggesting that an effective website design positively influences user

trust and happiness (Chakraborty et al., 2022; González-Rodríguez et al., 2017) and that the provision of reliable and protected information through web design is associated with higher levels of perceived enjoyment (Al-Kasasbeh et al., 2011; Einwiller, 2003). Similarly, a detrimental and substantial impact of web design (WEB) on perceived risk (RIS) was identified (H4). This supports the idea that it is important to use design to create a feeling of safety in consumers in order to evaluate how they perceive danger (Belanche et al., 2012). In this regard, various investigations maintain that using online design techniques to reduce perceived dangers can effectively foster user trust (Einwiller, 2003; García-Salirrosas & Rondon-Eusebio, 2022). The effect sizes discovered in this study were relatively large compared to previous research. Thus, González-Rodríguez et al. (2017) found that standardized coefficients for the impact of website quality on trust and satisfaction ranged from 0.15 to 0.34. During this study, the coefficients obtained were 0.59 for RIS and as high as 0.73 for ENJ. This may be attributed to the circumstances of retail consumers in a developing country, where the site design factor appears to have a significant impact on shaping the online shopping experience. Finally, the results of this study carried out on a group of Peruvian consumers reaffirm the significant influence of web design on several factors that affect online customer happiness. A well-designed website that effectively communicates security, ease of use, and risk minimization has a significant impact on the subjective evaluations of digital shoppers in the retail sector.

In relation to the second objective, a notable and significant impact was found on perceived usefulness (PU) on customer satisfaction (SAT) (H6), perceived pleasure (ENJ) on the SAT (H7), perceived security (SEC) on the SAT (H8), and customer service (CUS) on the SAT (H9). The results align with other research that suggests that e-commerce users' perceived usefulness, pleasure, security, and service quality positively influence their level of satisfaction (Liu & Napitupulu, 2020; Schmitt et al., 2013; Wen & Prybutok, 2011). More specifically, improving perceived usability can improve the customer experience by facilitating the acquisition of valuable information (Miao et al., 2022). Furthermore, ensuring security fosters trust when conducting online transactions, which leads to greater satisfaction (Barusman, 2019; Kassim & Asiah Abdullah, 2010). Regarding perceived enjoyment (ENJ), the findings agree with Evelina et al. (2020) and Nguyen & Llosa (2023) in that the positive emotions caused by interaction with the website have a strong impact on online customer satisfaction. Regarding customer service (CUS), previous studies also support its effect on e-commerce consumer satisfaction (Agarwal et al., 2022; Camilleri, 2022), concluding that active communication and permanent advice translate into a better customer experience. digital purchase. Compared with previous studies, the magnitude of the impact of perceived usefulness (PU) on satisfaction (0.29) was found to be smaller than the effect size reported by Zhou et al. (2009), who report a coefficient of 0.36 in a general context of electronic commerce. This suggests that, in the specific context of merchants, the utility variable may be of less importance compared to other variables, such as consumer-perceived satisfaction. Similarly, the magnitude found between the perception of security (SEC) and satisfaction was also weak, with a value of 0.15 compared to the conclusions of other studies such as Belanche et al. (2012), who report a coefficient of 0.26. Therefore, retail consumers in emerging countries may place more importance on website features other than security. In contrast, Evelina et al. (2020), who report a magnitude of 0.32 in Indonesian e-commerce consumers, found that the effect size of perceived enjoyment (ENJ) reached a coefficient of 0.355. Additionally, Le (2022) found a coefficient of 0.15 in a Vietnamese sample, whereas the impact of customer service (CUS) on satisfaction reported a size of 0.203, which was higher. This suggests that, in the online retail sector in emerging countries, buyers would prioritize predictors such as perceived enjoyment (ENJ) and quality of service (CUS) over more instrumental characteristics of the website.

Regarding the third objective, a significant and negative impact of perceived risk (RIS) on electronic word of mouth (E-WOM) was found (H5), as well as a significant and positive impact of customer satisfaction (SAT) on the E-WOM (H10). The results are consistent with previous research that has established a connection between reduced risk perception, increased consumer satisfaction, and a greater inclination to promote products online (Arilaha et al., 2021; Mutia et al., 2022; Shu-Hsien et al., 2021). To be more precise, the act of reducing perceived dangers on the website plays a crucial role in establishing the trust and satisfaction necessary to stimulate electronic word of mouth (Belanche et al., 2022). However, in contrast to previous studies, the impact of perceived risk (RIS) on E-WOM was less significant, with a coefficient of -0.449 compared to that observed by Carvache-Franco et al. (2022), who reported a magnitude of -0.61 in their study on bolivian electronic commerce users. Along the same lines, satisfaction (SAT) had a smaller effect on word-of-mouth (coefficient of 0.38) compared to the study by Agarwal et al. (2022) that looked at Indian traders and found a coefficient of 0.57. The study confirms the great importance of reducing perceived risk and increasing customer satisfaction to promote word-of-mouth and online recommendations in the retail sector of developing countries.

## 6. Conclusions

This study confirms the importance of web design in e-commerce, highlighting that it goes beyond aesthetics and encompasses the efficient execution of online transactions. An attractive, easy-to-use design that communicates safety and minimizes risks positively influences consumer satisfaction. Also, it is recognized that the relationship between web design and consumer satisfaction in electronic commerce can be mediated by additional factors such as perceived security, perceived enjoyment, perceived usefulness, risk perception, and customer service. These factors modulate the relationship and affect the generation of word-of-mouth recommendations.

The R2 values suggest that the study variables (perceived safety, perceived enjoyment, perceived usefulness, perceived risk, satisfaction, and E-WOM) explain a high proportion of the variability in satisfaction and the generation of E-WOM. Likewise, there is positive and significant evidence that web design positively impacts perceived security, perceived enjoyment, and perceived usefulness but negatively impacts perceived risk. Furthermore, the positive and significant impact of perceived

usefulness, perceived enjoyment, perceived safety, and customer service on consumer satisfaction is confirmed. In addition, consumer satisfaction positively impacts the generation of E-WOM. Also, the research confirms the importance of reducing perceived risk and increasing customer satisfaction to encourage the generation of electronic word-of-mouth recommendations in the retail sector of developing countries.

This study provides strong evidence on the relationship between web design, consumer satisfaction, and the generation of E-WOM in the context of retail e-commerce. These findings may be valuable to companies seeking to improve their online presence and stimulate positive word-of-mouth among consumers.

*6.1 Implications*

Regarding theoretical implications, this study enhances the current understanding of retail e-commerce by investigating the importance of web design in relation to consumer satisfaction and subsequent word-of-mouth recommendations. It also explores how risk perception, safety perception, perceived enjoyment, and perceived usefulness may operate as mediators in this association, as well as the impact of customer service on satisfaction. Therefore, this research improves the understanding of the variables that impact customer satisfaction and E-WOM in the online retail arena, helping researchers build more precise and comprehensive theoretical frameworks as well as generate innovative theories in the field of user experience in online retail. In terms of practical implications for organizations, online retail companies can use the study results to improve their website and provide a more rewarding shopping experience to their customers. In addition, they can ensure the provision of transparent information about services, as well as security and privacy rules. In addition, merchants can improve the efficiency and availability of their websites to improve the user experience, with a specific emphasis on decreasing perceived online customer vulnerability and improving the security and openness of their e-commerce platforms. Likewise, the study's findings can help merchants gain a deeper understanding of the determinants that impact consumer satisfaction in e-commerce and the future positioning that can be obtained thanks to the word-of-mouth recommendation generated by the satisfactory experience. Therefore, this knowledge can be used to design improved digital marketing tactics that increase customer satisfaction. Furthermore, the findings of this study have significant implications in terms of social implications. With the increasing prevalence of online commerce globally, the importance of risk perception and security in retail e-commerce is underlined. Consequently, it has the potential to mitigate online fraud and deception. Additionally, they can improve trust in online shopping, thereby promoting widespread acceptance of retail e-commerce as the optimal purchasing method. Consequently, this can have a beneficial influence on society's purchasing habits and contribute to the growth of the digital economy.

*6.2 Limitations*

Regarding the limitations of the study, the following factors should be taken into account: (1) Sampling: Non-probabilistic convenience sampling was used, which may restrict the applicability of the results to different contexts. Additionally, the sample consisted primarily of young, single, and highly educated individuals, which may limit the generalizability of the results to other demographic categories. (2) Research methodology: A non-experimental and cross-sectional design was used, which indicates that not all variables that could influence the results could be manipulated or regulated. Furthermore, the use of a self-administered questionnaire may have influenced the accuracy and reliability of the responses, while the absence of a control group may restrict the ability to establish causal relationships. (3) To collect data, an online survey was used, and the link was disseminated through the WhatsApp application, which may lead to a sample biased towards individuals with access to and mastery of technology. (4) The research was carried out during a specific period in a pandemic context, which may have led to an increased demand for technology in the purchasing process. This is because people were forced to learn and use these resources due to social isolation. Consequently, the study's conclusions may not be applicable to other time periods. (5) Regarding the appropriateness of factors related to the topic investigated, the study did not take into account the impact of other significant variables that could potentially influence customer happiness in e-commerce, such as site loading speed, the quality of the products, and the return policy. It is crucial to recognize these limitations when evaluating research results and assessing their relevance in different situations.

*6.3 Futures studies*

Regarding possible future studies, it is suggested to carry out studies in three specific thematic areas. (1) Online customer satisfaction research includes investigating the impact of factors such as website loading speed, product quality, and return policy on customer satisfaction in the retail e-commerce arena. The reason for establishing a connection between website loading speed and consumer satisfaction lies in the growing trend of online shopping, which requires websites to be fast and agile. Furthermore, by analyzing the impact of product quality on consumer happiness in the retail e-commerce sector, we can determine the specific product characteristics that most influence satisfaction. This will allow us to systematically offer high-quality products and maintain the cause-and-effect relationship between these factors. At the same time, examining the impact of the returns policy on consumer satisfaction in retail e-commerce will provide insight into whether this measure can mitigate the perceived risk associated with online purchasing. Conducting research on online customer happiness and its underlying factors can lead to customer loyalty and positive product recommendations, which can greatly benefit online retail businesses by increasing conversion rates and sales. (2) Web design research examines the impact of various design components, such as typography, content layout, and use of images, on purchase intention in retail e-commerce. Additionally, explore improving website accessibility and usability. The importance of this research lies in the fact that web design plays a fundamental role in the success of any e-commerce website. Additionally, website visitors expect a rewarding and satisfying user experience,

which can influence their purchase intention and the company's reputation. Therefore, the suggested research can help e-commerce website owners discern the most effective design components and save time and resources by avoiding ineffective designs that do not meet customer requirements. (3) Research related to customer service, such as examining the impact of customer service quality on purchasing decisions and customer loyalty in the context of retail e-commerce. These studies can cover various customer service channels, such as email, live chat, and social media, as well as customer service policies, including response times and the effectiveness of problem resolution before, during. and after purchase. The contribution of these studies is that they can provide e-commerce companies with a deeper understanding of how different aspects of online customer service can predict purchasing behavior, secure sales, and understand consumer consumption frequencies and preferences, with the aim of achieving their trust and loyalty.

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