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Prediction of online purchase behavior: an application of the S-O-R Model

Predicción del comportamiento de compra online: una aplicación del modelo S-O-R

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Abstract: the objective of this study was to evaluate the effect of the online store atmosphere, shopping values, attitude toward online shopping and emotions on the repurchase intention in an online store, based on the Stimulus-Organism-Response model (S-O-R). Although these elements have been studied in the context of brick-and-mortar stores, recent articles that analyze the influence of these elements in the online environment demonstrate the relevance of this study in current marketing research. The results of an online survey conducted with 306 users of an online pharmaceutical store, which included residents of Venezuela and of other Latin American countries, were analyzed using structural equations, evaluating both the measurement model and the relationship model. The findings allow us to conclude that the use of the S-O-R model is appropriate in predicting online purchase behavior, having achieved an adequate fit, and confirm that the hedonic purchase value has a significant direct impact on both the attitude toward online shopping and the emotional purchase. On the other hand, the utilitarian purchase value negatively affects the emotional purchase and the computer factor favors the attitude toward online purchase. Finally, the attitude toward online shopping and the emotional purchase predicts the repurchase intention. Implications for marketers are discussed.

Keywords: online store atmosphere, hedonic, utilitarian, attitude, emotional, repurchase, SOR, SEM.

Resumen: el objetivo de este estudio es evaluar el efecto de la atmósfera, definida como el diseño consciente del ambiente de la tienda para crear ciertas respuestas en los compradores, en los valores de compra, la actitud hacia la compra y las emociones sobre la intención de recompra en una tienda online, basado en el modelo Estímulo-Organismo-Respuesta (S-O-R, por sus siglas en inglés). Aunque estos elementos han sido estudiados ampliamente en el contexto de tiendas físicas, artículos recientes que analizan la influencia de estos elementos en el ambiente online muestran la relevancia de estudios como este en investigaciones académicas actuales de mercadeo. Los resultados de una encuesta realizada a 306 usuarios de una tienda farmacéutica online, residentes de Venezuela y otros países de América Latina, se analizaron usando ecuaciones estructurales. Los hallazgos permiten concluir que el uso del modelo S-O-R es apropiado en la predicción del comportamiento de compra online, y confirman que el valor de compra hedónico tiene un impacto directo significativo tanto en la actitud hacia las compras como en la compra emocional. Por otra parte, el valor de compra utilitario afecta negativamente la compra emocional y el factor informático favorece la actitud hacia las compras. Por último, la actitud hacia las compras y la compra emocional predicen la intención de recompra. Se discuten las implicaciones para los especialistas en marketing.

Palabras clave: atmósfera de tienda online, hedónico, utilitario, actitud, emoción, recompra, SOR, MEE. Atmósfera de tienda online, hedónico, utilitario, actitud, emoción, recompra, SOR, MEE.

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Introduction

The internet has catapulted commerce into an electronic age by changing the way in which consumers search, evaluate, buy and dispose of products and services. The number of online buyers has been growing in recent years and it is estimated that from 2022 to 2023, an additional 0.08 billion online shoppers were added, which means a 3.1% year-over-year growth.

E-commerce has grown uninterruptedly since the emergence of platforms such as Amazon or eBay in the mid-1990s and has been almost exponential in recent years, causing retail stores to pay special attention to the online medium. Given the proven and significant impact of "atmosphere signals" in traditional stores on shopper activity, questions were raised regarding the effect of these atmosphere signals, if any, in the context of online shopping and whether the principles they apply to traditional retail also apply to the online shopping experience.

The atmosphere is a critical aspect and includes the physical elements or characteristics of the interior of a store such as lighting, aroma, music and the arrangement of the merchandise (Baker *et al*., 1994). Numerous researchers in recent decades have raised questions regarding which environmental variables affect consumers' emotional states, how subsequent shopping behavior is affected, how a company should design the multisensory in-store experience to promote purchase and ensure purchase, return on the investment (Donovan *et al*., 1994; Spence, 2022) and recently these same concerns have been raised in the context of online stores (De Aguiar *et al*., 2019; Anwar *et al*., 2020).

In 1973, Kotler declared that one of the most influential elements when buying a product is the atmosphere of the place where this product is found or displayed and urged to understand and use all the power of the atmosphere of the store as a tool of marketing. Originally, he defined the atmosphere as "the conscious design of the store environment to create certain responses in buyers (...) specifically it is the effort to produce emotional effects that increase the probability of the customer's purchase" (p.50).

To decipher these influences and to understand consumer behavior, theories are proposed and models are developed that are tested with both traditional research tools and, more recently, with the emergence of neuromarketing, which provides techniques to measure brain and emotional responses of consumers when faced with stimuli (Shukla, 2019). Theories in marketing are essential to identify the determinants of consumer behavior and develop hypotheses about how these determinants interact. The present study is based on the S-O-R model of cognitive psychology (Eroglú *et al.*, 2001) and aims to evaluate the effect of some stimuli in the online store atmosphere together with internal variables of consumers on the intention to purchase.

S-O-R model: Stimulus-Organism-Response

The environment or physical atmosphere has been understood as the set of variables present in the store, such as music, light, color, smell and design of the space, capable of promoting a purchase response in the consumer. The interest in deciphering the impact of these factors has led to proposing models that help to predict buying behavior. In brick-and-mortar stores, Donovan and Rossiter, in 1982, adapted the model of environmental psychology of Mehrabian and Russel (1974) with the intention of clarifying the impact of factors of the stimulus or environment of the store together with some characteristics of people on the buy or no buy response. The model known by its acronym as S-O-R, proposes that the characteristics of the environment (Stimulus) promote certain emotional states and cognitive reactions (Organism), which determine behaviors of approaching or leaving the store (Response).

More explicitly, the stimulus (S) refers to that which affects the internal states and decision process of the individual, encouraging him to act; the organism (O) is understood as the set of states and internal affective and cognitive processes that intermediate between the stimulus and the responses of the individual. Affective or emotional states were originally characterized, following Mehrabian and Russell (1974) in

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three dimensions, identified by the acronym PAD: Pleasure - Displeasure; Activation - Avoidance and Dominance - Submission. Cognitive states are associated with everything that takes place in the mind during the acquisition, processing, retention and retrieval of information, namely: knowledge, memory, understanding, beliefs and attitudes. Response (R) is called the final action or reaction of the consumer, including psychological reactions such as attitudes and behaviors, depending on their approach, such as the physical approach, exploration, permanence or affiliation, or avoidance, such as physical distancing or abandonment.

The success of the S-O-R model in research in the commercial or retail sector is because it allows us to know how different stimuli affect consumers. To increase customer engagement behaviors, marketers find it essential to understand which factors in the environment produce both emotional and cognitive responses in their target consumers.

The shift towards shopping in virtual stores entails a redefinition of the atmosphere. Dailey (2004) paraphrasing Kotler (1973) defines the web atmosphere as the conscious design of the store's web environment to create certain responses in the buyers (such as positive affect and positive cognitions, etc.) to increase the favorable response of consumers (for example, revisit the site, explore, etc.) and increase the probability of purchase. Thus, it is said that when online marketers design virtual interfaces (web) with the aim of attracting consumers, they are using the web atmosphere as a marketing tool.

Eroglu *et al.* (2001) were the first to propose a systematic approach to the study of online retail. They adapted the S-O-R model by Donovan and Rossiter (1982) to describe and explain how atmospheric signals in the context of an online store (S) influence cognition, emotion (O) and response or shopping behavior (R). One of the most important contributions of these researchers has been the proposal of a taxonomy to classify the atmospheric qualities of online retail. They propose a distinction between environments that have keys with high and low relevance to the task. The environment with relevant keys includes descriptors of the website, verbal or pictographic, that appear on the screen and that facilitate and make the purchase possible by the consumer. An example of these signals would be the verbal content that facilitates the purchase of the product (characteristics of the merchandise, price, return policy), the icons or images and the website map. On the other hand, signals of low relevance to the task do not directly affect their completion, although they can create an atmosphere that makes the shopping experience more pleasant, triggers memories of the purchase in the store (traditional format) or provides confidence for purchase from an unfamiliar retailer, creating a website mood or image. These signs include colors, borders, background pattern, and typeface, among others.

The virtual atmosphere represents an additional design challenge as it includes technological elements typical of information systems and human aspects. Based on the classification of Eroglu *et al*. (2001) and to delimit the characteristics of the atmosphere of online stores, several taxonomies have been proposed (Manganari *et al*., 2009; Gatautis and Vaiciukynaite, 2013) that combine quality technological functionalities of the system or interface design such as hyperlink organization, personalized functions, access speed and self-correction of server errors with elements that contribute to user satisfaction categorized as enjoyment, cognitive results, user empowerment, credibility, organization and visual appearance of the information (Zhang and Von Dran, 2000) as well as interaction factors between the user and the technology: perceived ease and perceived usefulness, considered determinants of the acceptance of the information technology (classical technology acceptance model). For Richard (2005) the computing factors that determine the functionality of the virtual store correspond to highly relevant keys for the task; while the characteristics of the web that promote enjoyment, human factors, are considered keys of low relevance for the task (Eroglu *et al*., 2001).

Hausman and Siekpe (2009) evaluated the effect of the characteristics of the web interface, human and computer factors, on the intention to buy online and report that both factors are

antecedents of online purchase, specifically, they point out that elements such as use of graphics, 3D models, inclusion of humor, etc., attract, retain and motivate consumers to buy on websites and, likewise, computing factors such as organization, clear menus, security and privacy, among others, make consumers understand website design and browse for products and buy what is on offer. More recent results confirm that web design is a key factor for consumer purchasing response (Anaya-Sánchez *et al*., 2020).

On the other hand, Peng and Kim (2014) incorporated the hedonic and utilitarian purchase value as antecedent motivations (part of Stimulus in the S-O-R model) that affect consumer cognition and emotion. Research on buying behavior has identified hedonic and utilitarian motivations as the main types of motivations that move people. Hedonic and utilitarian always allude, in related literature, to how consumers are oriented towards the task: in a functional and instrumental way when talking about the utilitarian; and in an experiential, symbolic and aesthetic affective way that evokes fun, pleasure and excitement, when speaking of the hedonic (Picot-Coupey *et al*., 2021).

Peng and Kim (2014) evaluated the hedonic and utilitarian purchase value on the attitude towards the online purchase and the emotional purchase, the latter considered mediators of the repurchase intention response. The hedonic purchase value, for the authors, reflects the entertainment potential and emotional value of purchases, and is indicated by increased excitement, participation, perceived freedom, escapism, fantasy, and emotional aspects of the shopping experience; while the utilitarian purchase value occurs when the purchase satisfies particular consumer needs, reflecting a goal-oriented, cognitive and non-emotional result, consistent with the characterization of Babin *et al.* (1994). Peng and Kim (2014) showed that hedonic and utilitarian values, which they call the internal influences of the stimulus, are antecedents of the attitude towards online shopping and emotional purchases as well as the online store environment; in turn, the attitude towards online shopping is an effective mediator of purchase intention. Finally, they found that utilitarian purchase value had no impact on emotional purchase, and, also, emotional purchase did not predict purchase intention. In this way, the modified S-O-R model contrasted by these authors achieved partial empirical support in the data.

Moon *et al*. (2017) evaluated the effect of hedonic and utilitarian motivation on attitude towards online shopping and also the effect of attitude on intention. Their findings indicate that utilitarian aspects exert a greater effect on and from attitude on purchase intention compared to hedonic motivation. The accumulated evidence on the effect of hedonic and utilitarian motivation is not always consistent, however, the hedonic and utilitarian value are repeatedly included as antecedents in the investigations together with atmospheric elements to evaluate their impact on different mediating variables, such as attitude and emotion. Sütütemiz and Saygılı (2020) showed that hedonic and utilitarian purchasing motives are validly applied to the online shopping context and have a significant effect on purchase intention.

In the framework of the S-O-R model, cognitive and affective states as mediators have been conceptualized in different ways (Eroglú *et al*., 2001). The attitude towards online shopping has turned out to be a way of operationalizing how the consumer interprets the information coming from the online store environment and then affects the purchase intention (Peng and King, 2014). In general, attitude corresponds to the tendency of people to value an object, event, product or service in a favorable or unfavorable way. It is assumed that the attitude towards the different available consumption options (a product, store or service) determines the consumer's decision: in a situation of choice, the alternative towards which there is a general favorable attitude is selected (Ajzen, 2008; Hebbar *et al*., 2020).

Regarding affective states, other measures are currently included such as emotional regulation, affect, satisfaction, enjoyment, delight, etc., in addition to the classic dimensions of Pleasure-Activation-Dominance originally proposed by Mehrabian and Russel in 1974 (Kim *et al*., 2014). Emotion regulation is one of the ways in which the impact of hedonic and utilitarian value on the organism has been evaluated in the S-O-R

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model. Emotional regulation is understood as the behaviors and abilities of a person that serve to modulate, inhibit or enhance the emotional experience and its expression (Calkins and Hill, 2007). The hedonic and also the utilitarian purchase value can evoke positive emotional responses in the consumer and the increment of the emotional response increases the probability of purchase in the virtual store (Bui and Kemp, 2013; Peng and Kim, 2014). Finally, the intention to buy or use a product or service is often used as a substitute for behavior since it is assumed that intentions are good indications of what people will actually do. Evidence corroborates the effect of positive attitude towards online shopping and emotion on purchase intention (Kim and Park, 2005; Peng and Kim, 2014) and the predictive validity of behavioral intentions (Sheeran, 2002).

The evidence confirms the robustness of the S-O-R model to account for consumer behavior in virtual stores (Prashar *et al*., 2017; Moon *et al*., 2017; Xiao *et al*., 2019) as well as its flexibility to include new variables with status of background stimulus and mediator variables (Zhu *et al*., 2020) which endorses the theoretical and applied value of continuing the research in the area (Saricam, 2023). The present work continues the exploration of the relationship between variables included in the S-O-R model as adapted by Peng and Kim (2014), incorporating an alternative measurement of environmental elements, classified into computer and human factors (Richard, 2005; Hausman and Siekpe, 2009), on the assumption that these variables configure the web atmosphere in a more complete way and could optimize the prediction of the purchase in virtual stores, which is knowledge of great value for the planning and execution of marketing strategies in the electronic retail. For statistical robustness, two control variables were also incorporated in the analysis, sex and age, as direct predictors of repurchase intention.[1]

Materials and methods

Based on the previous review, the present work evaluates the effect of the web atmosphere of the store in terms of computer and human characteristics, together with the hedonic and utilitarian purchase value, on the attitude towards online shopping and emotional purchases, understood as variables mediators, which have a final impact on the intention to buy back in an online pharmacy retail with presence in Venezuela and Colombia. The conceptual proposal conforms to the S-O-R model of environmental psychology. Following the terminology of Peng and Kim (2014), the working hypothesis relating the relationship of the internal influences of the stimulus with the organism are defined as follows:

H_1: There is a positive relationship between the hedonic shopping value and the attitude toward online shopping.

H_2: There is a positive relationship between the utilitarian shopping value and the attitude toward online shopping.

H_3: There is a positive relationship between the hedonic shopping value and the emotional purchases.

H_4: There is a positive relationship between the utilitarian shopping value and the emotional purchases.

Similarly, the hypothesis relating the external stimuli, represented here by the two variables computer and human factors, with the organism are defined as follows:

H_5: There is a positive relationship between the computer factor and the attitude toward online shopping.

H_6: There is a positive relationship between the human factor and the attitude toward online shopping.

H_7: There is a positive relationship between the computer factor and the emotional purchases.

H_8: There is a positive relationship between the human factor and the emotional purchases.

The direct impact of sex and age on repurchase intention are formulated as follows:

1 The inclusion of control variables was kindly suggested by an anonymous referee.

H_9: There is a relationship between sex and the repurchase intention.

H_{10}: There is a positive relationship between the age and the repurchase intention.

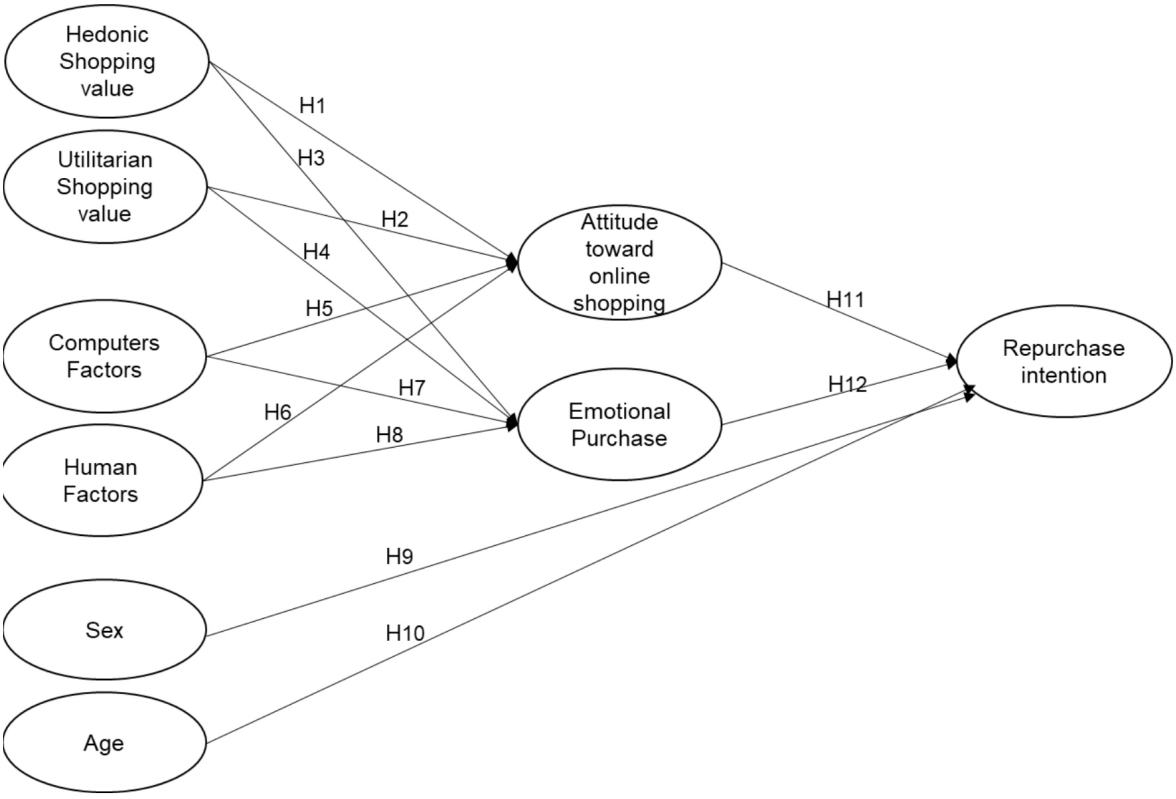
Finally, the hypothesis relating the organism with the response are defined as follows:

H_{11}: There is a positive relationship between attitude toward online shopping and the repurchase intention.

H_{12}: There is a positive relationship between the emotional purchases and the repurchase intention

The relationship between the variables is represented in Figure 1. Structural equation models were used to evaluate, initially, the reliability and validity of the measure and, afterwards, the relationships between the variables (Hair *et al.*, 2006).

Figure 1
Proposed research model



Instruments

The measurement instrument used is based on the questionnaire used by Peng and Kim (2014) and the one by Hausman and Siekpe (2009). From the instrument of Peng and Kim (2014), the items of hedonic purchase value (5 items) and utilitarian (5 items) correspond to the scale of Babin *et al*. (1994), who endorse its reliability, construct validity and nomological validity from exhaustive psychometric checks on multiple samples. Attitude toward online shopping was evaluated with 4 items taken from the work of Lee (2007), the variable Emotional purchases included 3 items proposed and validated by Bui and Kemp in 2013 and the intention to buy back was measured with 4 items that explore the probability, security and opportunity to buy again in the virtual store. All

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items are measured on a 7-point Likert scale of agreement-disagreement.

Peng and King (2014) carried out the evaluation of the reliability and validity of these measures and reported Cronbach's alpha values between 0.74 and 0.89 for all subscales as a test of the internal consistency of the measures. Likewise, they carried out a confirmatory factor analysis that revealed an adequate adjustment of these measures.

Hausman and Siekpe (2009) built and validated an instrument to evaluate computer and human factors as elements of the web atmosphere. Initially, they collected a large number of website characteristics from interviews with novice users and website experts. After a purification process, with the intervention of expert judges and independent user samples that reduced the first list of elements in each category, an exploratory factor analysis was carried out, resulting in 7 elements clearly designated as Human Factors and 15 as Computer Factors. In the present study, these computer and human factors were included, and the importance assigned by consumers was evaluated on a 7-point Likert scale (not important - very important).

Castillo (2021) used this instrument after conducting a pilot study that included the translation, revision and adjustment of the items by expert judges in languages and psychometrics, to guarantee their understanding and adaptation to the Spanish-speaking sample. The evaluation of the internal consistency of the subscales indicated their adequate reliability: the lowest Cronbach alpha coefficient was 0.71 and the highest was 0.88; values that are in a range considered adequate (Nunnally, 1978)

Participants

To evaluate the repurchase intention, an online survey was conducted. Out of the 620 participants who answered the survey, 314 had not made a purchase on the online platform of a retail pharmacy in the previous three months. Therefore, the analysis was made with the remaining non-probabilistic sample of 306 consumers: 66.3% of the sample was made up of women and the remaining 33.7% were men. The mean age was 33.8 years, the median age was 30 years, and the standard deviation was 12.7 years. 96% of the sample affirmed to reside in Venezuela and around 3.9% of the sample declared to reside in other countries such as Argentina, Colombia, Mexico and El Salvador.

Results and discussion

Measurement model

A development strategy was followed where the model was modified until the best possible version of both the measurement and structural models was achieved (Hair *et al*., 2006). As a first step, the reliability of the constructs was evaluated from Cronbach's alpha coefficient, which yielded values greater than 0.80, except for Human factors (HF) ($\alpha = 0.74$), Utilitarian shopping value ($\alpha = 0{,}76$) and Attitude toward online shopping (AOS) ($\alpha = 0.79$). Once the internal consistency was verified, the structural model was established, using R's *lavaan* (0.6-8) package. To identify the factorial model, the variance standardization method was used, which sets the variance of each factor to one (1) but freely estimates all charges. In the first measurement model evaluated, an item of the Utilitarian shopping value (USV) construct was eliminated from the result of the item-test correlation. The comparative indices achieved between the theoretical model and the proposed model indicated modest adjustments and, in the convergent validity analysis, it was observed that the value of the average variance extracted from the CF and HF constructs was around 0.35, well below the traditional cut-off point of 0.5 (Fornell and Larcker, 1981). In order to improve the measurement model, the correlations between the constructs were analyzed, some items were discarded, and the reliability was again evaluated. The consequence of these modifications was the elimination of the Human factors construct.

The set of indicators of the final model is shown in Table 1 together with the standardized loads resulting from the measurement model, the value of Cronbach's alpha and the average variance extracted (AVE) for each of the constructs.

There was an improvement in the Tucker-Lewis (0.832) and CFI (0.854) fit indices indicating an adequate fit. Likewise, both the RMSEA (0.092) and the SMRM (0.078) are in an acceptable range.

Table 1
CFA results for the measurement model

Factors and elements	Std. loadings	α	AVE
Hedonic shopping value (HSV)		0,87	0,52
Online shopping is truly a joy	0,78		
Compared to other things I could have done, the time spent online shopping was truly enjoyable	0,83		
I enjoyed the online shopping trip for its own sake, not just for the items I may have purchased.	0,85		
During online shopping, I felt the excitement of hunt.	0,63		
During online shopping, I felt a sense of adventure	0,63		
Utilitarian shopping value (USV)		0,87	0,65
I accomplished just what I wanted to on the online shopping trip.	0,83		
I could buy what I really needed.	0,87		
The prices of the products and services I purchased from online were at the right level and good quality.	0,67		
I feel my online shopping trip was successful.	0,83		
Computer factors (CF)		0,84	0,49
Clear displays of page contents	0,71		
Presence of clear menu items on each page	0,72		
Up-to-date information	0,73		
Logical webpage information	0,64		
Offers order confirmation	0,76		
Attitude toward online shopping (AOS)		0,79	0,47
I enjoy buying things through the Internet.	0,79		
I prefer online shopping.	0,72		
Purchasing in the online stores generally benefits the consumers.	0,56		
Online shopping is a good thing.	0,69		
Emotional purchase (EP)		0,71	0,55
In general, I often do the emotional shopping through Internet.	0,76		
I frequently shop online to cope with my emotions.	0,72		
Repurchase intention (RI)		0,85	0,76
I will likely repurchase in the online store.	0,91		
I will have the certain chance to repurchase in the online store.	0,82		

In the last contrasted measurement model, inspection of the results from Table 1 reveals that the lowest load is found at 0.56, which exceeds the criterion established by Netemayer *et al.* (2003) of 0.50. The composite reliability of the model is equal to 0.97, which gives evidence in favor of an adequate fit.

The mean variance extracted from the constructs reached values greater than 0.50 except for AOS (AVE = 0.47), which, however, is very close

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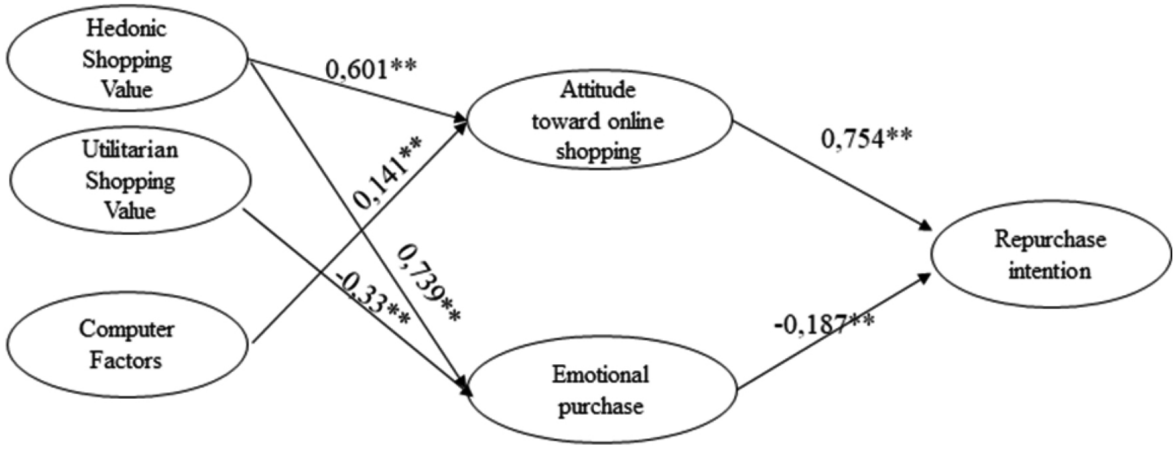
to this cut-off point, so convergent validity is considered acceptable (Fornell and Larcker, 1981). None of the squared correlations of the constructs was greater than the average variance extracted from any of the constructs, which confirms that the measure has discriminant validity. In view of the results, and after the modifications to the original model, it can be affirmed that the measurement model is acceptable: the constructs are reasonably represented by the included indicators.

Structural model

Once a measurement model with an acceptable fit was achieved, the structural model was evaluated (Hair *et al*., 2006). SEM techniques have been used to model consumer behavior in many contexts (Forero-Batista and Ortegón-Cortazar, 2023). Regarding the relationship model obtained, the estimated structural parameters corresponding to direct effects are shown in the following Figure 2. The greatest impact is recorded in the effect of the Hedonic Shopping Value (HSV) on Emotional purchases (EP), followed by the Attitude towards online shopping (AOS) on the Repurchase Intention (RI) and again the Hedonic Shopping Value (HSV) on the AOS.

Figure 2
Results of the structural model



** significant at p-value <0.01; All coefficients are standardized.
Note. Square multiple correlacion (SMC)= Attitude toward online: 0,43; Emotional Purchase: 0,33; Repurchase Intention: 0,51.

In this way, HSV is confirmed as a motivating antecedent element with a moderately high and statistically significant impact on the two variables considered mediators, namely, AOS and EP. The multisensory and emotional elements related to the shopping experience are linked to a more positive attitude towards online shopping and also promote greater emotional regulation at the time of purchase. This agrees with the results reported by Peng and Kim (2014), where hedonic values were shown to be antecedents of the attitude towards online shopping and emotional buying, while Moon *et al.* (2017) have also confirmed that the perception of hedonic attributes are predictors of the attitude towards online shopping.

On the other hand, a direct effect of USV on both AOS and EP was expected. The utilitarian value does not affect the attitude toward online shopping, according to sample results. These results only allow us to accept the hypothesis that relates USV with PE. Utility Value has a moderate, negative directional impact on EP. Utilitarian Value reflects an orientation towards

acquiring products in an efficient, cognitive and task-oriented manner and this indicates, in the present case, that consumers with high Utilitarian Purchase Value do not tend to use purchases as a regulator of emotions. According to Koo and Ju (2010), the informative and utilitarian aspects of the online store page have an influence on the emotional state and the purchase intention. Previous results from Peng and Kim (2014) found no relationship between USV and EP and confirmed the relationship between USV and AOS.

For Hausman and Siekpe (2009) Computer Factors (CF) such as organization, clear menus, security and privacy, make consumers understand the design of the website and navigate in search of products and buy what is offered, resulting in a positive attitude towards the site that favors the purchase intention, in line with the results obtained in this research. Thus, the results found in this study indicate a direct and low effect on the attitude towards online shopping. When users value aspects of the page's atmosphere linked to design, menus and information more positively, this impacts a more favorable attitude towards online shopping. Anaya-Sánchez *et al.* (2020) found, in this same direction, that web design influences purchasing attitude and behavior in electronic commerce. However, and contrary to one of the hypotheses of this study, these factors, which facilitate and make the web page understandable, do not exert any influence on EP.

Although Hausman and Siekpe (2009) report that the characteristics of the web interface include both human and computer design elements, and that both have positive effects and are antecedents of the purchase, the relevance of HF could not be validated.

No direct effect of sex nor age on the repurchase intention was found (Age: β=-0.076; p=0.12 and Sex: β=-0.059; p=0.23) and this is an interesting result for marketing managers, as they can direct their efforts to large markets that are not differentiated by these variables but rather by the variables that were found significant in this study. However, this result cannot be considered conclusive and further exploration on the impact of these, and other demographic variables is suggested.

On the other hand, findings show that both AOS and EP are predictive variables of repurchase intention. In their work, Peng and Kim (2014) only found a statistically significant relationship between the attitude towards online shopping and the intention to repurchase. The literature in the area suggests that AOS is an important predictor of purchase intention as verified here, consistent with the results reported in Moon *et al.* (2017) and Hebbar *et al.* (2020). Likewise, the negative and statistically significant relationship found between EP and RI indicates that people do not use their emotions as regulators of purchases of health and personal care products, which may account for the difference with the results reported by Peng and Kim (2014).

Finally, the present study did not find support for the hypothesis relating the value of USV and the AOS or between CF and EP. The absence of a relationship between the utilitarian purchase value and the attitude toward online shopping could be linked to the attitude measure used here: the utilitarian shopping value corresponds to cognitive attributes that evaluate the benefit and possible success of the purchase, while the attitude toward online shopping measure highlights the affective evaluation of the purchase. Likewise, it is necessary to point out that the computer factors measure used is different from the one included in the study by Kim and Peng (2014) and this may account for the differences in the results. Research in the area shows the existence of different ways of operationalizing computer elements or technological factors (Richard, 2005; Gatautis and Vaiciukynaite, 2013), which indicates the need to continue working on the validity of the measures of these constructs.

Conclusions

The study presents evidence that the theoretical framework of the S-O-R model is appropriate for studying online purchasing behavior. The results confirm that the elements of the web atmosphere, hedonic and utilitarian shopping values, in addition to computer factors, together with individual factors, influence online purchase behavior.

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The results obtained add value by showing that there is flexibility in the incorporation of mediating variables, such as attitude and emotions, on the repurchase intention in virtual stores. In the original model by Donovan and Rossiter (1982) and later in the adaptation carried out by Eroglu *et al*. (2001) these factors have always been present even when they have been conceptualized in different ways (Hebbar *et al*, 2020). The measurement and confirmation of the impact of these variables, as reported in previous research, contributes to the solidity of the S-O-R model.

Regarding the role of hedonic and utilitarian values, it is interesting to note that these variables have played a role both as antecedents (Prashar *et al*., 2017) and as mediators of the purchase response (Sütütemiz and Saygılı, 2020). In both roles, there is evidence of their impact. In this study, its role as an antecedent is verified; although it continues to be a research area to explore and to establish its impact in online shopping.

Additionally, it is important to point out that progress is made by incorporating antecedent variables linked to characteristics of the web interface. Clarifying which of the many and varied factors are relevant as determinants of online purchase behavior is an area of fruitful research, as exemplified in the work of Zhu *et al.* (2020).

On the other hand, this study contributes to the literature on the Internet and offers valuable information for online pharmacy retail. Findings provide useful information for the design of the online shopping environment and for setting up marketing strategies. For example, given the effect of hedonic purchase value on both online shopping attitude and repurchase intention, it is recommended that retailers design pleasant and entertaining shopping experiences for their customers along with attractive products that satisfy the feeling of enjoyment, pleasure, and adventure during shopping. It seems that in online stores it is necessary to add elements that make the shopping experience more pleasant and exciting to guarantee repurchase. In a web dedicated to the sale of pharmacy and personal care products, it seems advisable to add information on utilitarian aspects such as price, assortment, and availability of products to promote recurring purchases in line with our results.

Based on the present findings, it seems relevant to consider computer factors for the design of online retailer's strategies. Results suggest that a friendly, easy to use and simple web design can influence the attitude towards online shopping and thus the intention to repurchase. A better understanding of how these computing characteristics translate to target customers will provide guidelines for the design of environments that favor purchase.

In future research and to overcome some limitations, it would be convenient to review and optimize the indicators of the included constructs to obtain a better approximation to their measurement. Likewise, it is recommended to apply the instrument in larger and different samples in order to increase the generalization of the results. It is important to reconsider the inclusion of other variables within the S-O-R model that may account for online purchase and repurchase intention. The related literature shows that multiple variables have been included in the model in the area: a meta-analysis would be a convenient way to discriminate and select those constructs that have shown greater predictive power in the case of online purchases.

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