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e-RetailTest: Scale to Assess the Attitude of Consumers towards E-Commerce in the Retail Sector

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Abstract: Changes in consumer behavior are driven by tastes and preferences that change over time as their socioeconomic conditions change. The objective of this study was to validate the psychometric characteristics of the e-RetailTest scale, created to measure consumer attitudes towards online shopping in developing countries, particularly in the Peruvian market. The e-RetailTest evaluates five variables present in the online purchase process: (a) quality of web design, (b) risk when making a purchase, (c) customer service, (d) security and (e) satisfaction, with a total of twenty items using a Likert scale. A total of 422 valid responses were collected from Peruvian consumers who had had online shopping experience in the retail sector. Statistically, we worked with the AFE exploratory factor analysis and the AFC confirmatory factor analysis. The results suggest that this first version of the e-RetailTest presents adequate psychometric evidence to measure the attitude of consumers towards online purchases in the retail sector in the Peruvian market. Thus, it seeks to contribute to the advancement of the study of these important variables of Latin American consumer behavior.

Keywords: consumer attitude; E-commerce; retail; online shopping; scale

1. Introduction

The arrival of the COVID-19 pandemic interrupted face-to-face activities around the world, making technology the main channel of interaction in different human activities. The technology has been adopted by various organizations in all commercial environments, telecommuting, and education and has also been adopted in everyday activities such as online shopping [1,2]. Embracing these digital channels requires an evolution towards multi-channel and omni-channel retail business models, where physical and digital channels (phygital experience) are integrated and managed simultaneously [3]. In this way, retailers are challenged to find the perfect balance between offering seamless shopping experiences and efficiently managing their channel offer with the resources they have to satisfy the online customer [4]. This fact constituted an opportunity for people to become involved with technology, making use of the Internet as the primary means for commercial transactions and online purchases [1,5].

The increase in online purchases was very notorious in the retail sector, which is made up of the different commercial premises that sell directly to the public in a retail manner. In the Peruvian case, the retail sector is considered to be large department chains, supermarkets, and commercial stores that sell products to large numbers of customers [6,7]. Sales in this sector fell by 49.87% during the month of May 2020, with the clothing, footwear, electrical appliances, and household items businesses being the most affected [8]. Despite this, the pandemic generated an opportunity in online sales at the end of 2020, increasing by 250% in the retail sector [7].

In addition, it is important to highlight that online purchases are forms of consumption that are carried out through digital media and virtual stores that, due to the ease of access, navigation, and other benefits, capture the attention of the consumer and influence their purchase decision. [9]. This precedent has allowed other studies that report that a key piece to attracting the attention of a user is to develop an attractive website, which contains a good distribution of its contents and allows easy navigation [10–12], representing these attributes, quality, and a satisfactory shopping experience [13,14].

From these characteristics, the usability of the web stands out, determined by the need to have a friendly design that promotes the use of electronic commerce for all age groups of consumers and that also have attributes that favor their visibility [15], thus knowing the user's experience regarding the electronic sales platform they use [16]. Another characteristic of the website is the feasibility and usability that promotes customer satisfaction for online purchases [17,18], based on this idea, it is stated that the impact of the usability of websites is a determinant for satisfaction of the user and a response to the demand for quality of care in this virtual environment [17].

Another important aspect to take into account in online purchases is the concern for perceived risk and security when carrying out a commercial transaction since, as explained in the Perceived Risk Theory, in all commercial exchanges, buyers tend to avoid risks and prefer them over the benefits of any purchasing activity, including online purchases [4,19–22]. For this reason, it is highlighted that electronic insecurity has become a factor that decreases the intention to purchase online and avoids that consumers highlight the great benefits of electronic service; however, with the arrival of the pandemic, online sales were in high demand, due to the obligation of consumers to buy without the need to have contact, thus avoiding the spread of COVID-19 and creating a new purchasing behavior for the consumer [23–25].

Finally, the perspectives referred to in the previous paragraphs, the record of a notable increase in online purchases, the adoption of technology in organizations, the implementation of virtual store services and the development of new technological platforms for customer service. Demand and new demands from consumers underwent an important change after the arrival of the pandemic [4,17], for which the research question of how the e-RetailTest scale could evaluate the attitude of consumers towards E- commerce in the retail sector is highlighted, intending with this study to validate an instrument that can be used as a commercial strategy in electronic markets based on previous consumer experience in the retail sector of Peru. For this reason, the objective is to validate the psychometric characteristics of the e-RetaiTest scale, created to measure the attitude of consumers towards online purchases in the retail sector in developing countries, especially in the Peruvian market, through processes of validity and reliability that ensure the evidence of a consistent instrument for this purpose, thus covering the research gap of the non-existence of a scale that evaluates the new attitudes of consumers towards E-commerce in the retail sector at a post-pandemic time.

1.1. Literature Review

Consumers represent a very large economic group within any economy; every company needs to acquire a solid customer base in order to survive in the market [26], and the arrival of the pandemic became a great challenge for traditional businesses. The new consumption trend caused the innovation of the markets, within them the adoption of electronic businesses [27]. In this context, it is necessary to know the attitudes of the consumer towards these new platforms and it is precisely the new platforms that require the presentation of a virtual store that adequately responds to the doubts and needs of the customers [4,28].

Evaluating online purchases in the retail sector requires considering various criteria. Researchers Kumar and Anjaly developed a scale to measure the experience of customers after the purchase, they validated an instrument made up of 35 items grouped into six dimensions: (a) delivery; (b) return and exchange; (c) customer support; (d) feel good; (e) benefits; and (f) product in hand, demonstrating that the customer experience during the online purchase process is multidimensional and that they prioritize the quality and speed of the service received [29].

Regarding the instruments that evaluate the attitudes of customers towards online purchases, there are studies that develop scales focused on consumer satisfaction in online purchases through the usability of the web and the perceived risk in the purchase intention [28,30,31]. In addition, other instrumental studies focus on the consumer's shopping experience to assess aesthetics, the purchase process, convenience, product selection, price offerings, and level of service [28]. Other authors refer to the fact that good web architecture is not enough to provide a good online shopping experience [32,33], revealing that detailed product information, privacy and security, customer service and ease of Navigation are attributes that stand out in the perception and attitude of consumers when making a purchase, thus generating a positive experience, these factors being those that increase the possibility of making a purchase [34].

One of the most addressed issues regarding the consumer is their satisfaction; for this reason, the studies by Parasuraman, Zeithaml, and Malhotra stand out, who proposed two scales (ES-Qual and E- RecS-Qual) to measure the perception of online service quality and recovery from problems experienced by customers. Through the following dimensions: (a) efficiency; (b) fulfillment; (c) system availability; (d) privacy; (e) responsiveness; (f) compensation; and (g) contact [35]. Likewise, a study carried out in Peru proposes an instrument called USAWEB, made up of ten items, which seeks to measure the consumer's shopping experience through the usability of the online store website [28]. Additionally, another instrumental study focused on online MiPymes is called PERVAINCONSA, which aimed to measure consumer purchasing behavior online through four variables: (a) perception of value; (b) purchase intention; (c) trust; and (d) satisfaction, demonstrating in its results an important psychometric evidence for the Latin American context [36].

Based on this background, an instrument is presented below that is made up of five variables: web design, perceived risk, customer service, security, and satisfaction, the same ones that are specified in the following paragraphs:

1.1.1. Web Design

Studies indicate the existence of three important elements must be considered when developing a website: (a) visual design; (b) navigation design; and (c) the design of the information. Regarding the visual design of the website, it is related to aesthetics, which includes colors, font types, images, design and shapes; which positively impact customer trust and reduce the perceived risk [37]. Regarding the navigation design, it refers to the structure that the website has to help customers navigate easily and in a friendly way through the different sections of the website [38]. Additionally, the design of the information basically refers to the way in which the information published on the website is organized [39]. It is in this way that platforms focused on electronic commerce play a fundamental role in improving the quality of customer service through websites; that is, the design and quality of the websites can increase or decrease the purchase intentions of consumers [40].

1.1.2. Perceived Risk

It is the uncertainty and unpredictable consequences that customers experience at the beginning of a purchase process [23]. In addition, the perceived risks involve: (a) financial risk; (b) product risk; (c) security risk; (d) time hazard; (e) social risk; and (f) psychological risk [41]. However, the risks consumers may encounter most when shopping online include financial risks and product risks [20,24]. Financial risk refers to the

loss of money from a client for various reasons associated with the purchase of a product, while product risk refers to the loss incurred when a product or service does not comply with what is offered [42]. Other authors analyzed various sources of perceived risks online, such as the recording of personal data, the security of financial transactions, and product performance [22,43].

1.1.3. Customer Service

It is the action that leads to a communication between the representative of a company and the client. Various researchers have studied the types of customer service based on the forms of communication [44], others have classified it into pre-sale, sale, and post-sale customer service [45]. Regardless of the type of service, it is important that there must be a good quality of customer service, since the subjective evaluation made by consumers regarding the interaction processes of the service will depend on it [40]; In this way, the interaction process is also understood as the existing communication between the company and the client, but with the support of electronic commerce platforms where clients can perceive the quality of service online [46].

1.1.4. Security

It is the perception that the client presents in relation to privacy, the action of generating trust in the consumer [47]. In addition, it refers to the protection of a good, a characteristic desired by the consumer when making a purchase or transaction through the web. One of the ways to provide security to consumers is that the company can be aware of the importance of security in information systems, not violate security policies, and adequately manage the risks that can be caused by the use of a system [48]. Additionally, providing security also allows users to make effective decisions regarding the purchase of a product and/or the acquisition of a service [49].

1.1.5. Satisfaction

Customer satisfaction is considered the backbone of any company, and its relevance can generate success in companies [50]. In addition, it is the positive attitude of an individual toward an innovative service that manages to promote customer repurchase behavior [51], being one of the determinants of satisfaction, the quality of the perceived service [52], and one of its measured rewards [53].

2. Materials and Methods

The study seeks to evaluate the validity and reliability of the e-RetailTest scale, which has been designed considering the scientific literature according to the online purchasing behavior carried out by consumers. Therefore, this scale aims to assess the attitude of consumers towards online purchases in the retail sector of developing countries such as Peru.

The e-RetailTest scale measures five variables related to the perceptions of customers who make online purchases in the retail sector: (a) quality of web design (eight items); (b) risk when making a purchase (four items); (c) customer service (three items); (d) security (three items); and (e) satisfaction (two items). The scale has a total of 20 items that are evaluated using a Likert scale, in a range of 1 to 5 points, corresponding to the categories that go from "totally disagree" to "totally agree", respectively. The scale was developed based on the updated literature regarding the variables present in an online purchase process that impact consumer attitudes, web design quality [28,37–39,54,55], perceived risk [22,30,41–43], customer service [45,50,54,55], safety [41,48], and satisfaction [29,36,37,40,53,55].

2.1. Instrument Validation

The instrument items for each variable were formulated by the authors considering the previously exposed literature. The intention was to develop a questionnaire that was friendly and short, that is, that it had the minimum number of questions but that, at the same

time, contains the necessary and sufficient elements to measure each variable proposed in the scale. Content validity and semantic validity were performed by videoconference through two focus group sessions using the Zoom virtual platform.

The first focus group was made up of four expert marketing professionals residing in Peru. For content validation, a group of specialists who met the following inclusion criteria were invited to participate: those who were administration or marketing professionals, those who had at least two years of experience in the retail sector, those who had experience in online sales, and those who were willing to participate in the research. Those cases in which the experts did not have time to participate in the focus session were excluded. The experts evaluated the content, relevance, clarity, and sufficiency of the questions for each variable; subsequently, the suggestions for improvement to the questionnaire made by the specialists were taken into account, confirming the content validity of the scale. The second focus group was made up of six users from the retail sector. To be included in the study, they had to be users over 18 years of age and of both sexes who had made online purchases in the retail sector within the last six months prior to the carrying out this study, in addition to being willing to participate in the research voluntarily. These users carried out the semantic validity, that is, it was verified that the consumers understood the true meaning of the statements, not being necessary to make further adjustments since the scale was fully understood by the group. Then, the data was collected in the group of consumers virtually and, later, the analysis of the psychometric evidence of the e-RetailTest scale was carried out. In Appendix A (Table A1) you can see each of the items of the final scale.

2.2. Data Collect

The questionnaire was hosted on Google Form, including a section for informed consent, filter questions, and sociodemographic data. The questionnaire link was shared virtually to a sample for convenience through a participation message through the WhatsApp application. The sample consisted of various users of legal age and of both sexes who have made online purchases in the retail sector within the last six months prior to data collection. At the beginning of the questionnaire, the informed consent was given in which the participants were recorded about the objective of the study, free and voluntary participation, the non-obligatory nature of completing the survey and the assurance that their data would be treated in a manner anonymous and exclusive for research purposes. Upon acceptance of the informed consent, the virtual form allowed the participants to continue with the development of the survey, without time limits.

Table 1 shows the technical data sheet of the research, it should be noted that initially 638 questionnaires were collected, however, only 422 responses have been considered for data processing, since, to achieve the objective of this study, it was necessary that the participants would have had online shopping experience in the retail sector in Peru. In this case, there were only 422 respondents who stated that they had made online purchases in the retail sector during the last six months prior to the application of the survey.

Table 1. Research Technical Sheet.

Item	Description
Population	E-commerce consumers in the retail sector
Geographic scope	Lima Peru.
Sample size	422
Sampling type	For convenience
Data collection	Through Google Form and WhatsApp
Data collection period	From July 8 to August 27, 2021
Statistical analysis techniques	EFA [1]-CFA [2]-SEM [3]

[1] EFA = Exploratory Factor Analysis. [2] CFA = Confirmatory Factor Analysis. [3] SEM = Structural equation model.

For data analysis, the SPSS-22 and AMOS-24 programs were used. The data was analyzed using structural equation modeling (SEM) and, as the collected data was nor-

mal, the maximum similarity technique was used, as this technique provides statistically significant results.

3. Results

Sociodemographic characteristics included gender, age, and country, as shown in Table 2.

Table 2. Sociodemographic characteristics (N = 422).

Sociodemographic Variable		Frequency	Percentage
Sex	Female	231	54.7
	Male	191	45.3
Age	18–30	324	76.8
	31–45	62	14.7
	46–55	27	6.4
	56–67	9	2.1
Civil status	Married	44	10.4
	With couple	67	15.9
	Divorced	6	1.4
	Single	299	70.9
	Widower	6	1.4
Academic level	Secondary	54	12.8
	Technical	124	29.4
	academic	244	57.8

A sample was identified where the female sex predominated (54.7%), and the predominant age was 18 to 30 years (76.8%). In other words, the study population was predominantly young and easily adapted to new technologies, therefore the results of this study would be basically focused on this sector of consumers and could not be generalized to the entire universe of consumers in the Peruvian market.

Table 3 shows the descriptive statistics of the items of the e-RetailTest scale (mean, standard deviation, asymmetry, and kurtosis). It is observed that all the values of asymmetry and kurtosis are less than +/−1.5 [56], which allows the assumption of multivariate normality to be fulfilled.

Table 4 shows the exploratory factor analysis (EFA) of the items, where it can be observed that the items are distributed in five factors according to the variables analyzed. The results show that there is a clear difference between the five variables. The Kaiser-Meyer-Olkin test is greater than 0.7 (KMO = 0.951) which is high and the Bartlett test is highly significant (Sig = 0.000), so factor analysis can be performed. The total variance explained in the model is 73.697%, which is greater than 50%, with Web Design Quality (PW) = 41.48%; perceived risk (PR) = 18.22%, Customer Service (SC) = 7.30%, Security (SG) 4.20%, and Satisfaction (SA) = 3.11%. Except for Item PW9, which came out distributed in two factors, and therefore it was necessary to eliminate it. All the items were grouped according to the study variables, thus confirming the theories on which the variables are based. With these results and to continue with the validation process, the confirmatory factor analysis (CFA) was carried out.

Table 3. Previous Exploration of the Items.

Code	Half	Median	Fashion	Deviation Standard	Asymmetry	Kurtosis
PW1	3.68	4.00	4.00	1.21	−0.71	−0.38
PW2	3.65	4.00	4.00	1.10	−0.46	−0.60
PW3	3.60	4.00	5.00	1.18	−0.42	−0.82
PW4	3.66	4.00	4.00	1.16	−0.49	−0.73
PW5	3.76	4.00	5.00	1.16	−0.70	−0.38
PW6	3.71	4.00	4.00	1.15	−0.55	−0.67
PW7	3.48	4.00	4.00	1.21	−0.37	−0.86
PW8	3.57	4.00	4.00	1.18	−0.41	−0.86
PW9	3.32	3.00	4.00	1.28	−0.29	−0.97
PW10	3.37	3.00	3.00	1.19	−0.20	−0.89
SC1	3.22	3.00	3.00	1.25	−0.12	−0.99
SC2	3.25	3.00	3.00	1.19	−0.10	−0.92
SC3	3.27	3.00	4.00	1.26	−0.18	−1.02
SG1	3.32	3.00	3.00	1.19	−0.26	−0.72
SG2	3.33	3.00	3.00	1.17	−0.09	−0.90
SG3	3.30	3.00	3.00	1.18	−0.17	−0.77
SA1	3.68	4.00	4.00	1.15	−0.64	−0.32
SA2	3.70	4.00	4.00	1.11	−0.55	−0.42
NS1	3.48	4.00	5.00	1.28	−0.42	−0.88
NS2	3.48	4.00	4.00	1.22	−0.42	−0.75
RP1	3.51	4.00	3.00	1.22	−0.41	−0.73
RP2	3.59	4.00	4.00	1.11	−0.41	−0.63
RP3	3.55	4.00	4.00	1.15	−0.40	−0.64
RP4	3.56	4.00	3.00	1.13	−0.35	−0.62

Table 4. Exploratory Factor Analysis (EFA).

Code	Factor				
	One	2	3	4	5
PW5	0.956				
PW4	0.951				
PW3	0.875				
PW6	0.830				
PW2	0.771				
PW1	0.644				
PW7	0.600				
PW8	0.570				
PW10	0.472				
RP4		0.897			
RP3		0.873			
RP1		0.822			
RP2		0.806			
SC1			0.852		
SC2			0.826		
SC3			0.813		
SG2				0.904	
SG3				0.883	
SG1				0.681	
SA1					0.958
SA2					0.612

Extraction method: maximum likelihood. Rotation method: Promax with Kaiser normalization.

To evaluate the reliability of e-RetailTest, Cronbach's Alpha (α) has been used, which is a most used indicator for the verification of scales [57]. To be considered an adequate level, the values of the latent variables must be greater than 0.70 [58]. The results of this study are satisfactory since all the indicators are above 0.901. The observed factor loading of each latent variable (Std Beta) is between 0.738 and 0.935, these values meet the requirements of the Fornell and Larcker index [59]. Regarding convergent validity, the mean variance extracted (AVE) and Composition Reliability (CR) were used. The AVE indicator is considered acceptable with values equal to or greater than 0.5 [58] and CR must be greater than 0.6 [60]. In this investigation, an AVE is observed with values equal to or greater than 0.666, and CR with values equal to or greater than 0.902. Which means that each latent variable shows a good level (see Table 5).

Table 5. Validation of the Measurement Model and Convergent Validity.

Predictor	Items	Std Beta	(α)	CR	AVE
PW	PW1	0.842 ***	0.949	0.947	0.666
	PW2	0.862 ***			
	PW3	0.837 ***			
	PW4	0.846 ***			
	PW5	0.848 ***			
	PW6	0.817 ***			
	PW7	0.784 ***			
	PW8	0.738 ***			
	PW10	0.763 ***			
PR	RP1	0.796 ***	0.913	0.915	0.728
	RP2	0.851 ***			
	RP3	0.887 ***			
	RP4	0.877 ***			
SC	SC1	0.884 ***	0.901	0.902	0.754
	SC2	0.853 ***			
	SC3	0.868 ***			
SG	SG1	0.903 ***	0.929	0.924	0.801
	SG2	0.894 ***			
	SG3	0.887 ***			
SA	SA1	0.935 ***	0. 921	0.925	0.854
	SA2	0.913 ***			

Cronbach's alpha (α) for all variables is >0.8, the composite reliability (CR) > 0.70 and the mean-variance extracted (AVE) > 0.50; *** $p < 0.001$ (significance level); indicating a significant validity of the model.

Figure 1 shows the factorial structure of the e-RetailTest scale in the study population, in this case, they are consumers of the retail sector in Peru.

Table 6 shows the indicators of the adjustment of the measurement model of the e-RetailTest scale and it is observed that it meets all the indicators adequately.

Table 6. Adjustment of the e-RetailTest scale model.

Measure	Estimate	Threshold	Interpretation
CMIN	428,954	–	–
DF	175,000	–	–
CMIN/DF	2451	Between 1 and 3	excellent
CFI	0.969	>0.95	excellent
SRMR	0.031	<0.08	excellent
RMSEA	0.059	<0.06	excellent
PCclose	0.021	>0.05	acceptable

Hu and Bentler [61] recommend combinations of measures of CFI > 0.95 and SRMR < 0.08. Additionally, to further solidify the evidence, add the RMSEA < 0.06.
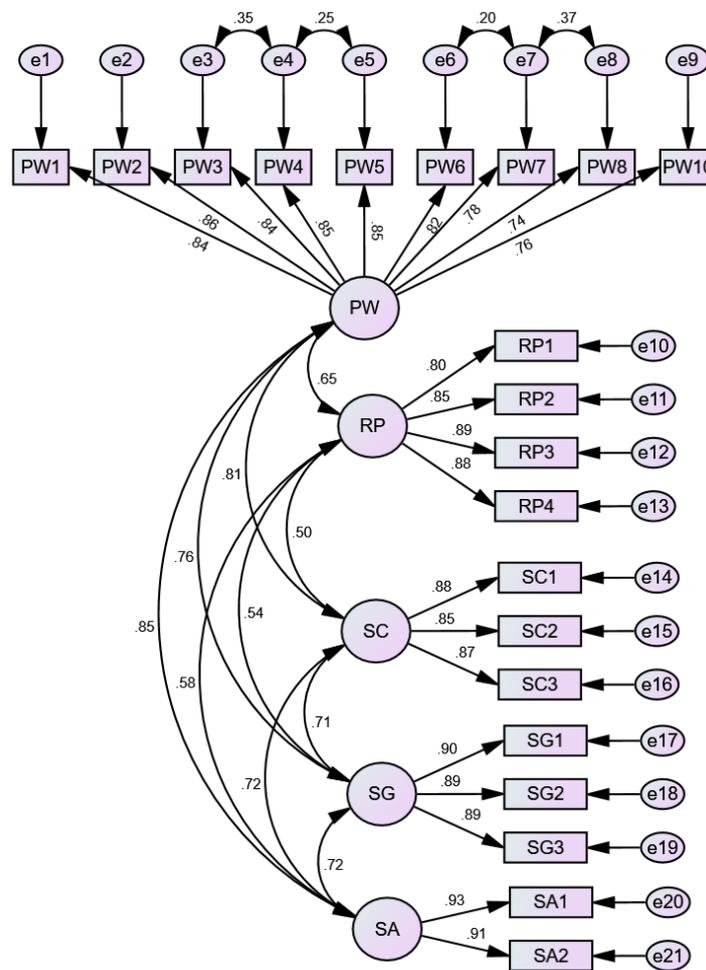
Figure 1. Measurement model of the e-RetailTest scale.

Table 7 presents the discriminant validity, according to Fornell and Larker [59], the measurement model is validated as long as the confidence intervals do not reach unity and the covariances to the quantile do not exceed the AVE.

Table 7. Validation of the discriminant validity of the measurement model. (Fornell-Lacker criteria).

	CR	AVE	P.W.	PR	SC	SG	SA
P.W.	0.947	0.666	0.816				
PR	0.915	0.728	0.654 ***	0.853			
SC	0.902	0.754	0.807 ***	0.505 ***	0.868		
SG	0.924	0.801	0.760 ***	0.544 ***	0.714 ***	0.895	
SA	0.921	0.854	0.849 ***	0.581 ***	0.716 ***	0.723 ***	0.924

*** $p < 0.001$ (significance level).

Therefore, these researchers propose an alternative approach, based on the multitrait-multimethod matrix to assess discriminant validity called heterotrait-monotrait correlation ratio (HTMT). Henseler, Ringle, and Sarstedt [62] demonstrated the superior performance of this approach using a Monte Carlo simulation study, in which these authors compared the new approach with the Fornell-Larcker criterion and the (partial) cross-load test. They provide guidelines on how to handle discriminant validity problems in variance-based structural equation modeling. Therefore, in this study, we have complemented our analyses with the heterotrait-monotrait criterion to assess discriminant validity. If the HTMT value is below 0.90, discriminant validity between two reflective constructs has been established [62] (see Table 8).

Table 8. Discriminant validity of the model using the heterotroit-monotrait ratio (HTMT) criteria.

	P.W.	PR	SC	SG	SA
PW					
PR	0.646				
SC	0.809	0.508			
SG	0.759	0.541	0.714		
SA	0.844	0.583	0.719	0.719	

4. Discussion

The objective of this instrumental design study was to present the evidence of validity and reliability of the e-RetailTest scale, which seeks to measure the attitude of consumers towards online purchases in the retail sector in Peru. Although the evidence has not determined that the instrument is exclusively for measuring the attitudes of all customers in the retail sector, it is recommended that the application of the scale be oriented exclusively to assess the online purchasing attitude of the customers of the large department stores that sell retail products, considering the sociodemographic attributes of the participants in the validation of this instrument, especially the age which was massively between 18 and 30 years (76.8%). However, this does not exclude adaptations that seek to assess the attitudes of online customers of other nationalities, older age groups, other business sectors, or the establishment of specificity and sensitivity measures to establish cut-off points and determine scales by some sociodemographic characteristics.

The e-RetailTest scale was built based on theoretical models that determine customer perceptions of their attitude towards online purchases in the retail sector [22,28,30,37–54,63,64], therefore, these perceptions are determined, among others, by five variables present in the online purchase process: (a) Quality of web design, for which eight items were established and aimed at measuring the design of the information, specifically, the way in which the information published on the website is organized [37–40]; (b) Risk at the time of making a purchase, for which four items were established that evaluate the uncertainty and unpredictable consequences that customers experience at the beginning of a purchase process [41,42]; (c) Customer service, determined by three items that evaluate the action that leads to effective communication between the company representative and the online customer [40,44–46]; (d) Security, which has three items and measures the customer's perception of privacy, protection, and trust throughout the purchase process [47–49] and (e) Satisfaction, represented by two items that evaluate the positive attitude of the customer regarding the service received and their expectations and that succeeds in promoting repurchase behavior [50–53].

The importance of building and validating an instrument that measures the online shopping attitude of customers lies in the changes derived in consumer behavior as a result of virtualization, as an effect of the COVID-19 pandemic [4]. Although the economies had negative results in both production and consumption, one of the activities that increased in frequency was online commerce, since the confinement policies at the beginning of the pandemic forced consumers to become familiar with technology throughout the world human activity in order to maintain social distancing and avoid direct contact in the purchase process [65–68]. This online shopping attitude has been maintained during the period of economic reactivation and in commercial activities after the pandemic, so much so that, in the Peruvian case, online purchases increased by 250% in the retail sector [7]. For this reason, it is possible that the perception and attitude towards online shopping of consumers may have a variation in their measure given the new online shopping habit that consumers have acquired after the most difficult years of the pandemic and the new strategies and virtual channels of electronic commerce adopted by companies.

In this context, the basic elements that make up the online shopping attitude in the retail sector are described for its measurement, especially in Peruvian customers. In addition, the development of the Internet and mobile communication technologies have prompted companies to provide additional ways to become closer to their customers,

especially through E-commerce, so these variables must be present in any instrument that intends to assess online consumer attitudes.

It is worth noting that the study of online purchasing behavior is not new, since it appears on par with the development of electronic commerce at the end of the 20th century; where the quality of the websites was considered as the main driver of customer sales information and interaction, so it should be considered in the evaluation of online purchasing behavior [31]. Another variable that is most present in the tools that evaluate all purchase intentions is satisfaction, based mainly on the quality of the service perceived after the experience in the purchase process and even after the purchase made [51]. However, satisfaction is accentuated to the extent that risk is minimized when making a purchase, so in online shopping it is the perceived risk that plays a crucial role in this decision, being considered as one of the main factors to be taken into account when measuring consumer buying behavior online [4,23]. Therefore, online shopping will be suspended or will not complete its process if the consumer's feeling of uncertainty increases due to the presence of five main risks: (a) financial risk; (b) product risk; (c) security risk; (d) time hazard; (e) social risk; and (f) psychological risk [41].

To minimize the perception of risk, it is important that customers find security throughout the online purchase process and this implies good privacy management and the generation of trust in the purchase made [47,69], so measuring the perception of Consumer security in virtual media for purchase is a predictive factor in the effective purchase decision of a product or service [49]. Likewise, customer service is considered an important element in the measurement of behaviors related to the satisfaction of a purchase, based on the form of communication, as a crucial factor for closing a sale and customer loyalty [44,45].

The e-RetailTest scale was built with 20 items evaluated using a Likert scale. Content validity was developed by four marketing professionals who were experts in the theories used and who confirmed that each item presented clarity, relevance, and sufficiency in relation to the theories used for its construction.

Regarding the evidence found, the descriptive statistics of asymmetry and kurtosis reached values lower than $+/-1.5$, which allowed the assumption of multivariate normality to be fulfilled [56]. In addition, the AFE showed that the items of the e-RetailTest scale are distributed in five factors, finding a clear difference between them. The KMO test reaches a high level ($0.951 > 0.7$) and the Bartlett test a highly significant level ($Sig = 0.000$). Likewise, the total variance explained in the model is 73.697%, which is greater than 50%, with Web Design Quality (PW) = 41.48%; perceived risk (PR) = 18.22%, Customer Service (SC) = 7.30%, Security (SG) 4.20% and Satisfaction (SA) = 3.11%. On the contrary, Item PW9 came out distributed in two factors and therefore it was necessary to eliminate it. All the items were grouped according to the study variables, thus confirming the theories on which the variables are based.

Regarding the validation of the measurement model and the convergent validity, a Cronbach's alpha (α) > 0.8 was obtained for all the variables; likewise, CFI values > 0.70 and AVE > 0.50 were reached, with a significance level < 0.001; indicating a significant validation of the model. Regarding the adjustment of the e-RetailTest scale model, it was found that the indicators, for the most part, reach excellent levels. Finally, the discriminant validity of the measurement model met all the requirements, since the confidence intervals did not reach unity and the quantile covariances did not exceed the AVE.

Other instruments created that pursue similar objectives are the *Online Post-Purchase scale customer Experience* (OPPCE) developed by Kumar and Anjaly [29] and the *Scale for Assessment Electronic Service Quality* (ES-Qual) built and validated by Parasuraman, Zeithaml, and Malhotra [35]. Regarding the first instrument, the authors offered a scale to measure the purchase intention of customers through online media based on the post-purchase experience, thus validating an instrument made up of six dimensions: (a) delivery, (b) return and exchange, (c) customer support, (d) feel good, (e) benefits and (f) product in hand, making a total of 35 items and demonstrating that the customer experience is multidimensional. Regarding the second instrument, the authors proposed two scales (ES-

Qual and E-RecS-Qual) to measure the perception of online service quality through a retail website (ES-Qual) and the recovery when a customer I present problems with the service (E-RecS-Qual). To do this, they proposed seven dimensions, the first four for the ES- Qual scale and the last three for the ES-Qual: (a) efficiency, understood as the ease and speed of access and use of the website; (b) fulfillment, which is the extent to which the site's promises about order delivery and item availability are kept; (c) system availability, which is the correct technical functioning of the site; (d) privacy, referring to the degree to which the site is secure and protects customer information; (e) responsiveness, defined as the effective handling of issues and returns through the site; (f) compensation, understood as the degree to which the site compensates customers for the problems experienced with the service; and (g) contact, referring to the availability of assistance through telephone or online commercial representatives to provide assistance in the event of problems [35].

Regarding the validity results of both the OPPCE and the ES- Qual, the CFA showed that all the indices reached the required level and adequate load in their dimensions, so the authors concluded that the results support validity as an instrument, which makes it possible to predict the online purchase intention of customers based on previous experience in the use of this resource (OPPCE) and customer satisfaction as a result of the quality of service received in an online retail purchase process (ES- Qual). It should be noted that both instruments share dimensions similar to those proposed in the e-RetailTest scale with notable differentiated contributions, such as in the case of E-RecS-Qual, which proposes an evaluation of the attention to problems experienced by customers in the purchase process or purchasing online, which were not considered in the construction of this instrument.

As in the cited studies, the e-RetailTest scale was identified as an instrument with adequate metric properties for the customer population of Peruvian online retail stores, with the similarity that all the cited instruments require experience in the process of purchasing online and with the differences in that the e-RetailTest scale not only seeks to measure the purchase intention, but also the attitude of consumers towards E- commerce in the retail sector based on perceptions both in the presentation of the design of the different online sales channels as well as the evaluation of the service received and the minimization of risk in the purchase process by the customer. However, it is noted that, according to the instruments presented as antecedents, although previous experience is highlighted as a crucial factor in the purchase intention in online media, the scales show more specific dimensions related to the actions and benefits offered by the media [29] and in the measurement of the quality of the service received in an online purchase process [35], which have not been considered in the e-RetailTest scale, because the differentiating objective is to evaluate the customer's attitude towards the E-commerce to predict the valuation and continuity in the use of this service. Despite these differences in the objectives and specific forms of evaluation of the different behaviors in online shopping, the validity results show similarity in all the instruments analyzed, so it is feasible to carry out an external convergent validity that allows greater evidence and that guarantees a greater predictive strength of the e-RetailTest scale.

4.1. Implications

At a theoretical level, the e-RetailTest scale contributes to the line of instrumental research by offering a means to measure the attitude to purchase online, specifically in the retail sector, based on current and current theoretical models on the variables related to the purchase process or purchasing online [22,28,30,37–54,63,64], whose authors state that the attitudes of customers in an online purchase process and their prediction for future purchases can be measured through various evaluations that the customer made from the security during the online purchase process [47–49], the risk perceived during the purchase intention [41,42], the ease that the design of the virtual store offers to make the purchase [37–40], the service received through the different communication channels and the delivery process [40,44–46], and the satisfaction perceived from the online shopping experience [50–53]. In addition, it is made known that the first version of this instrument

was not built to be exclusive to online purchases in the retail sector; however, this version is oriented to this commercial item since, for the validation of the instrument, there was exclusively a group of consumer participants from large retail stores, so its current version is a scale that is designed for consumers. Customers in this sector, covering both a theoretical and practical gap for which there is no specific background, this instrument being a novelty given the exposed characteristics.

Another contribution that derives from the situation and that it is important to highlight is that the e-RetailTest scale was built considering the new purchasing habits acquired by consumers as a result of the COVID-19 pandemic. In other words, today the evaluations and attitudes of customers towards online purchases are different from those that were carried out before the pandemic [70], this is motivated by the obligation to use these resources in different human activities in order to to avoid social contact, which led to an advance in technological development for various commercial transactions and the massive use of virtual stores by companies and consumers [4]. Therefore, the e-RetailTest scale has the differentiating advantage of being an instrument built under the demands of post-pandemic online consumers.

At an academic level, the e-RetailTest scale will help students and teachers of the various disciplines oriented to the study of marketing, consumer behavior, business administration, and the creation of virtual consumer media, to deepen practical knowledge of the attitudes of customers who make purchases online and can obtain precise information on the variables that intervene in the perceptions of consumers of virtual stores and can contrast them with the different theories of consumer behavior for the sake of generating debates that allow enriching knowledge about the topic. Likewise, this instrument will allow researchers to carry out various empirical studies with the aim of establishing diagnoses about the attitudes of online customers and relating it at causal or predictive levels with other organizational and human actions that allow supporting the theories known to date, or which contribute new findings related to the topic.

At the business level, the e-RetailTest scale will allow marketing specialists to develop strategies more in line with the perception of customers who make purchases through virtual media, considering the five factors that are included in the instrument, with the aim to guide decision-making in the improvements of each of these variables and thus ensure the loyalty of the customer who opts for this service in their purchase intentions.

4.2. Limitations and Future Studies

The most important limitation of the e-RetailTest scale is the orientation that derives from its name, since it is validated in clients of the retail sector, specifically in the Peruvian reality. Although its reagents can very well be adapted to any other commercial sector, since it is not considered a more open customer sample, it is not suggested that it be applied to consumers from other sectors, since the perceptions of a customer of large retail stores may have differences from customers who receive other services or perform another form of consumption. In addition, since it is an instrument that measures the attitudes of customers in the online purchase process, it should not be used in face-to-face or mixed purchase processes either. In this sense, it is recommended to carry out future adaptation studies of the instrument with a greater breadth in commercial sectors or to develop adaptations in other specific areas such as the online purchase process of small and medium-sized businesses, wholesale sales or sales of services.

Other limitations that have not been covered in this validation are those derived from the sociodemographic characteristics of the participants. In the first place, the informant group is all of Peruvian nationality, so, although it is possible to use the instrument with consumers from other countries with similar characteristics or from Latin America, it is recommended to make specific adaptations for each situation or expand the sample with participants from different countries, ensuring that the items are easily understood by the entire informant group. It is made known that, due to the selection for convenience of the participants, there was a spontaneous inclination towards an age group between

18 to 30 years (76.8%), single marital status (70.9%), and higher academic level (57.8%). Therefore, it is recommended to carry out new studies with a stratified sample in order to verify if the evidence is maintained or varies when the sociodemographic attributes of the participants are controlled.

In addition, one of the most significant limitations was the absence of filter questions that make it possible to determine if the participant was a buyer or a consumer, since knowing the role of the person who makes the purchase will allow us to know more precisely the attitude of the real consumer towards the process of online shopping. This consultation is important to determine if the strong presence of young people in the use of online platforms is due to their need to consume or if they also fulfill a role of buyers in favor of other consumers who are not familiar with the system. If this is the case, some factors on the scale, such as security, perceived risk, and satisfaction, should consider some items that address the actual consumer and not just those who fulfill the role of online buyers. Therefore, it is recommended that future adaptations of the e-RetailTest scale may consider modifications in the items that are aimed at knowing the attitudes of the real consumers who make the final purchase decision. Likewise, it is recommended to carry out empirical studies that make it possible to relate the dynamics between the online buyer and the consumer or decision-maker, to recognize the frequencies of the roles assumed by those who use the E-commerce system and the reasons that lead real consumers not to directly use this service.

Likewise, online consumers of different sexes, age group, marital statuses, and academic levels have participated in this validation; however, the differences of these groups have not been considered in the analysis, so there is no information on whether these variables have any specific participation in the results obtained. Finally, the present version of the e-RetailTest scale has not considered cut-off points to determine levels or scales of consumer attitudes toward E-commerce in the retail sector, so it is suggested to make equitable divisions in the direct scores obtained on the scale if it is required to determine levels based on an ordinal measurement scale. For this reason, it is suggested to carry out future studies where a statistical range of scores is determined with criteria of specificity and sensitivity that allow the interpretation of the results of this scale, either at a general level or due to their sociodemographic characteristics, in case the differences in the scores to determine the levels from percentiles are significant in these groups.

5. Conclusions

Today, online shopping is part of the new normal for many consumers and its preference as a shopping method is increasing. For this reason, the present study presented the psychometric evidence of validity and reliability of the e-RetailTest scale that measures consumer attitudes towards E- commerce in the retail sector based on the variables web design, customer service, security, perceived risk, and satisfaction.

The deep analysis of the validity and reliability of the e-RetailTest scale, to evaluate the attitudes of consumers towards online purchases in the Peruvian retail sector, confirms the evidence found, where the AFE showed that the items of the scale are divided into five factors with a clear distinction between them. The KMO test reaches a high level (0.951 > 0.7) and the Bartlett test reaches a very significant level (Sig = 0.000). In addition, Cronbach's Alpha (α) for all variables was >0.8. A CFI > 0.70 and an AVE > 0.50; *** $p < 0.001$ indicates significant model validity. Similarly, the discriminant validity of the model met the objective of the study, since the confidence intervals did not reach unity and the covariances to the quartile did not exceed the AVE.

Appendix A

This scale measures five variables: (a) web design; (b) customer service; (c) security; (c) perceived risk; and (e) customer satisfaction. It has a total of 21 items, which are evaluated using a Likert scale, in a range of 1 to 5 points, where 1 means "Totally disagree" and 5 means "Totally agree".

Table A1. e-RetailTest Scale Reagents.

Construct	Code	Measurement Items
Web page		The web design of the online stores in which I have bought:
	PW1	It's visually pleasing
	PW2	Present useful and necessary information
	PW3	It is easy to use to make an online payment
	PW4	It is easy to use to complete my purchase process
	PW5	Presents an understandable and easy to read text
	PW6	It has a wide variety of products that interest me
	PW7	Offer discounts or free shipping
	PW8	Presents prices lower than those of physical stores
	PW10	charge quickly
Customer service		Online store customer service:
	SC1	They provide me with all the facilities to present a doubt or claim
	SC2	They have customer service representatives available online
	SC3	They give me options to return the items
Security	SG1	I feel that there is security in my transactions with online stores
	SG2	I feel that my card information is protected in online stores
	SG3	I feel that my personal information is protected in online stores
perceived risk		I feel at risk when buying, due to:
	RP1	To the delivery of personal information
	RP2	To product quality
	RP3	To the return and exchange policies
	RP4	To security policies within the site
Satisfaction		Based on my general experience:
	SA1	I am satisfied with my purchases in online stores
	SA2	I am satisfied with the online stores

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