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1. Introduction

Augmented reality (AR) is increasingly receiving attention from both users and retailers. The AR market is expected to grow from US$3.5 billion in 2017 to more than US$198 billion in 2025 (BIS Research, 2018). According to Superdata (2018), a Nielsen company, there are over 1 billion mobile AR users worldwide, of which 41% report using AR features in online shopping apps. Similarly, Nielsen (2019) reported that 57% use, or are willing to use, mobile apps for in-store navigation to assess products and find deals. Scholars have pointed out that smartphones and apps, in combination with AR, virtual reality (VR), and artificial intelligence, have changed how customers shop (Grewal *et. al.* 2017), transformed the customer experience (Hoyer *et al.*, 2020), and affected behavioural intentions (Park and Yoo, 2020; Poushneh, and Vasquez-Parraga, 2017). Despite the growing importance of retailer apps, both in-store and in online environments (Grewal, et al., 2020), there is little knowledge about AR as a shopper-facing technology in the retail context.

Technological developments in retail seem likely to accelerate the introduction of non-personal retailer-customer interactions, which are being fostered by the COVID-19 pandemic and social distancing requirements (Forrester Research, 2020). In fact, a recent commentary published in the Harvard Business Review posited that AR is redefining retail in the pandemic (Papagianni, 2020); these will involve expanded applications such as virtual reality, among others (Roggeveen and Sethuraman, 2020). From a conceptual point of view, AR can be seen as a self-service technology (SST) whose acceptance is grounded on various theories of acceptance models (Blut *et al*., 2016). SSTs are “technological interfaces that enable customers to produce services independent of direct service employee involvement” (Meuter, *et al.*, 2000, p.50). Traditional SSTs, such as self-service checkouts, ATMs, and digital kiosks have been around for decades. However, due to technological advances, retailers have recently integrated AR and VR (Wedel, *et al.,* 2020). AR-based SSTs allow customers to interact, usually through mobile devices, with products, and perform tasks without the involvement of store personnel. Retailers such as IKEA have created AR-based apps to place furniture in real living spaces; while others, such as Polo Ralph Lauren, have tested virtual fitting rooms in physical stores in which shoppers can “try on” products, browse for accessories, and ask staff for different sizes (e.g., Uniqlo). Retailers have used the Sephora Virtual Artist and L'Oréal Makeup Genius apps to allow clients to try virtual makeup options. Supermarket (Demoulin and Djelassi, 2016) and fashion-based (Rese, *et al.*, 2017) studies have shown that SSTs are adopted for utilitarian and hedonic motives (Cetto, *et al.*, 2015; To, *et al.*, 2007).

Despite the growing adoption of AR in retailing, scarce academic evidence exists as to the factors that influence customers to use AR-based SSTs in retail until recent years (Inman and Nikolova, 2017; Lai, 2017; Rese, et. al., 2014; Park and Yoo, 2020; Perannagari and Chakrabarti, 2020; Poushneh, and Vasquez-Parraga, 2017; Stoyanova, et. al., 2015). Improving the generalizability of the findings has been claimed when analyzing the acceptance of augmented reality in retail (Perannagari and Chakrabarti, 2020). Therefore, we propose an extended technology acceptance model as an instrument to predict the adoption of AR in retailing in two countries, a developed country and a developing country. The prior literature has shown the applicability of the TAM for predicting AR in retailing (Holdack et al., 2021). Therefore, our conceptual framework uses the TAM as its core and adds distinctive antecedents from the SST and AR literature. The research goal is twofold. First, to determine the factors that influence the acceptance and adoption of AR-based SSTs; the augmented reality in retail model (ARiR Model) extends the original TAM to AR-based SSTs by including antecedent constructs based on the SST and AR literature. Second, accessibility to technology has evolved quicker in developed than developing countries. Most TAM studies have been conducted in developed countries. The technological development literature emphasises the importance of testing the TAM’s validity in developing countries (Rojas-Méndez, *et. al.*, 2015; Sukkar and Hasan, 2005). Similarly, the diffusion of AR is heavily dependent on internet access. Accordingly, the second research goal is to test the ARiR model in two countries with different stages of economic development and Internet usage; a developed economy, that is, the USA, with an internet penetration rate of 87% in 2019, and a developing economy, Nicaragua, with a rate of 46% in 2019 (The World Bank, 2020). Our aim in the study is to go beyond simply analysing the model in a country with a high level of economic development and technological adoption, that is, the US, by comparing the central adoption concept between a developed and a developing economy. Nicaragua was chosen from among the Latin America countries because the differences between it and the USA in terms of economic development, smartphone, and internet access, and overall attitude towards consumer technological acceptance, are great, based on GDP and mobile subscription data (for details, see International Monetary Fund 2020; Latin America e-Readiness Report, 2016; The World Bank, 2020).

This paper contributes to the extant knowledge by: first, identifying which factors influence the acceptance and adoption of AR-based SSTs; second, by proposing an augmented reality in retail model; and, third, by analysing whether a country's stage of economic development affects AR adoption.

The remainder of the present study is organised as follows. We first review the relevant literature in two main research streams, SSTs and TAMs. Then, a research model, formed by a set of hypotheses based on eight constructs, is proposed. Next, we present the methodology and the results of the test of the model. Section 5 presents the discussion and implications. Last, we present the conclusions, limitations, and further research lines.

2. Theoretical framework and hypotheses development

As Blut et al. (2016) posited in their meta-analysis, the factors that impact on SST acceptance remain unclear. Based on Blut et al (2016) and the most recent literature on retailing (Adapa et al., 2020; Lee and Lyu, 2019; Sharma, Ueno, and Kingshott, 2021) the drivers of SST adoption can be sorted into three categories: (i) SST characteristics such as perceived ease of use, usefulness, convenience, newness, enjoyment, perceived control and perceived risk; (ii) customer characteristics such as the need for interaction, perceived self-efficacy, perceived complexity, demographics, technology anxiety, need for human interaction, consumer innovativeness, technology readiness, attitudes towards use, attitudes towards control and convenience, perceptions of personalisation and cost efficiency, subjective norms and behavioural inertia; (iii) situational factors such as perceived waiting time, task complexity and the presence of others. This long list needs to be viewed in the context of the wide technological options available in retailing (for a review, see Roggeveen and Sethuraman, 2020), including, among others, kiosks, chatbots, voice assistants, web-morphing personalisation, beacons, robots, blockchain, smart try on mirrors and virtual and augmented reality.

Within the increasing types of offline and online retail formats, immersive retail including AR and VR is attracting investment from brands and retailers, and the attention of academics

(Gauri, et al., 2021). In particular, AR allows "customers to see how a particular product looks in a simulated real-life environment" (Gauri et al., 2021; p. 12). This type of customer-facing technology is changing retailing (Shankar et al., 2021). The growth of mobile device-based AR is fostering new ways of retailing (Caboni and Hagberg, 2019). Indeed, most applications can be used both in brick and mortar stores, as a complementary in-store experience, and online through e-commerce.

The TAM and its extensions have been used to study the acceptance of AR apps (Pantano, Rese & Baier, 2017; Perannagari and Chakrabarti, 2020; Shankar et al., 2021) through the analysis of its core constructs, ease of use, usefulness and attitude (Davis, 1989), and by adding AR-related features as antecedents. We adopt this extended view, that is, we place the TAM at the core of the model and add selected antecedents from the AR literature. Based on the extension of self-concept into the digital environment, Scholz and Duffy (2018) suggested that intimate consumer-brand relationships might develop through AR that will ultimately address the need for personal interaction; aesthetics has been acknowledged as a means through which to stimulate the user's sensory perception (Lourerio et al., 2019; Pantano et al, 2017); navigation encompasses the process of exploring the interactivity of SSTs (Childers et al., 2001) and has been recognized as part of the AR (Wedel, et al. 2020). Self-efficacy captures the cognitive dimension in terms of the user's belief that (s)he has the personal skills to adopt SSTs. Last, the motivators of technology readiness relate to the consumer characteristics that are important for the adoption of SSTs. Therefore, we propose a model of AR acceptance anchored in the TAM but with the addition of specific antecedents of AR.

2.1 Self-Service Technologies and AR

SSTs often require increased cognitive involvement from customers to co-produce services, which allows greater customisation and more satisfying experiences (Tsiotsou and Wirtz, 2015). However, the SST literature shows contradictory results. One stream of research emphasises the benefits of using SSTs (Inman and Nikolova, 2017), while Gelderman *et al.* (2011) found that the need for interaction negatively affected SST use.

AR enriches the view of the real world by adding virtual objects and persuading the viewer that they are real (Haugstvedt and Krogstie, 2012). AR differs from VR, which creates a complete interactive virtual environment and requires users to use eyewear (e.g., head-mounted displays); AR can be used with modern devices such as smartphones, tablets, and computers (Alcañiz, *et al.*, 2019).

Retail settings are being challenged to become smarter; this includes making use of mobile AR apps via smartphones/other handheld devices. Mobile AR apps create greater purchase satisfaction and provide benefits such as increased purchase likelihood, word-of-mouth, in-store visits, and retail customer satisfaction (Dacko, 2017).

2.2 Technology Acceptance Models

Numerous papers have addressed different technology acceptance theories (e.g., Blut, *et. al.*, 2016; Meuter, *et. al.*, 2000; Weijters, *et. al.*, 2007) with the aim of providing guidelines for the effective introduction of SSTs. The most prominent theoretical models are the TAM (Davis, 1989; Davis, *et al.*, 1989), the UTAUT (Venkatesh, *et al.*, 2003), the UTAUT2 (Venkatesh, *et al.*, 2012) and the TRAM (Lin, *et al.*, 2007). **-----Table 1** summarises the previous research into SSTs in the retail industry.

-----Table 1----

The proposed model draws on the original TAM developed by Davis *et. al.* (1989). This included and acknowledged the importance of external variables (Davis, 1989). The TAM suggests that perceived usefulness (PU) and perceived ease of use (PEOU) determine the adoption and use of technology and, at the same time, that they are influenced by external factors (Blut, *et al.*, 2016; Lai, 2017). The model proposes that an individual’s acceptance of a technology is determined by his/her voluntary intentions towards using the technology, while intention to use is determined by the individual’s attitude towards the technology and his/her perception of its usefulness (Yousafzai, *et al.*, 2007).

In the context of new technology, the users' willingness to use it becomes of high interest. In this sense, the technology readiness index (TRI) suggested by Parasuraman (2020) as ‘‘people’s propensity to embrace and use new technologies for accomplishing goals in home life and at work” (p. 308) has been revealed of interest for AR. Indeed, TR was correlated with the perception of mobile app usefulness in virtual and augmented settings (Blasko et al., 2020). The TRI consists of four constructs: optimism, innovativeness, discomfort, and insecurity. The TRI was subsequently merged with the TAM by Lin *et. al.*

(2007) to create an integrated technology readiness and acceptance model (TRAM). This model proposed that TR was an antecedent of both PU and PEOU, and affected use intention.

Research Model and Hypotheses

The proposed research model applies and extends the original TAM to AR-based SSTs by including antecedent constructs based on previous studies, explained in this section.

Perceived Ease of Use

Perceived ease of use is the degree to which a person believes that using a technology will be effortless (Davis, *et al.*, 1989). The TAM proposes that the easier a technology is to use, and the more useful it is perceived, the more positive will be the individual's attitude towards it (Dwivedi, *et al.*, 2019). Therefore, the following hypotheses are proposed:

H1. Perceived ease of use has a positive effect on the perceived usefulness of AR-based SSTs.

H2. Perceived ease of use has a positive effect on attitude towards AR-based SSTs.

Perceived Usefulness

Perceived usefulness is the extent to which a person believes that using a particular system will enhance his or her performance (Davis, *et al.*, 1989). The TAM proposes that PU has positive effect on attitude. This has been demonstrated in previous SST and AR studies (e.g., Chung, *et. al.*, 2015; Huang and Liao, 2015; Rese, *et. al.*, 2017). Thus, it is proposed that:

H3. Perceived usefulness has a positive effect on attitude towards AR-based SSTs.

Aesthetics

Mathwick *et. al.* (2001) stated that aesthetics in the retail context was reflected in two key dimensions: the visual elements of the retail environment and the entertainment aspects of the service itself when performed. Visual appeal includes the visual elements that enhance the overall presentation of a system (Chung, *et al.*, 2015). AR applications reinforce the user's view of the real world, and this affects perceived usefulness and perceived ease of use (Chung, *et al.*, 2015). Entertainment (also known as enjoyment) effects are considered to be an important dimension of aesthetics (Haugstvedt and Krogstie, 2012; Rese, et. al., 2014). Previous literature on AR has identified entertainment with the AR app as antecedent of AR adoption (Kowalczuk, Siepmann, and Adler, 2021; Pantano, Rese, and Baier, 2017; Qin, Peak, and Prybutok, 2021). By extending previous findings and in line with Mathick (2011) we integrate visual appeal and entertainment as components of aesthetics.

Studies have shown that aesthetics impact on perceived ease of use and perceived usefulness (e.g., Chung, *et. al.*, 2015). Huang and Liao (2015) found a positive relationship between perceived aesthetics and using augmented reality interactive technology. Such study was focused on a website of a clothing retailer through a sample of students. Extending such findings into the adoption of SSTs (i.e., smartphone devices) into the TAM variables, the following hypotheses are proposed:

H4. Aesthetics has a positive effect on the perceived usefulness of AR-based SSTs.

H5. Aesthetics has a positive effect on the perceived ease of use of AR-based SSTs.

Need for Personal Interaction

The need for personal interaction with service employees has been found to be an important determinant influencing SST use (Demoulin and Djelassi, 2016) but there are contradictory results. Some studies have highlighted the consumer's need for interaction with employees (Larivière et al., 2017) and its beneficial effects on service quality (Sharma et al., 2021) and reduced perceived risk (Featherman and Hajli, 2016). On the other hand, other studies have found that consumers prefer to avoid contact with employees (Meuter et al., 2000) because technology provides functional performance and replaces social needs (Fernandes and Oliveira, 2020); similarly, situational factors, such as perceived waiting time, have been proposed as reasons for avoiding contact with employees (Wang et al., 2013). Nevertheless, avoiding human contact creates spatial and social distance that negatively impacts on retailer-customer relationships (Giovanis and Athanasopoulou, 2018).

SST-based studies have shown that the need for interaction has a negative effect on SST use (e.g., Curran and Meuter, 2005; Dabholkar and Bagozzi, 2002; Demoulin and Djelassi, 2016; Gelderman, *et. al.*, 2011). For instance, some SST devices (e.g., checkouts) replace staff by technology. In AR settings, the higher interactivity and the wider types of interaction drive adoption, and reduce the perceived complexity of SSTs (Adapa et al., 2020). Furthermore, again in AR settings, perceived enjoyment and perceived informativeness are acknowledged as predictors of the acceptance of AR wearables in retailing (Holdack et al., 2021). Therefore, following this reasoning, and taking into account Blut et al.'s (2016) meta-analysis, we propose that the need for personal interaction might have a negative effect on the perceived usefulness of technologies. By extending this reasoning into AR settings, the following hypothesis is proposed:

H6. The need for personal interaction has a negative effect on the perceived usefulness of AR-based SSTs.

Self-Efficacy

Self-efficacy has been defined as "self-confidence in terms of possessing the skills required to perform a task" (Demoulin and Djelassi, 2016, p. 544). As a cognitive determinant of behaviour, self-efficacy influences intention to use at early stages of the consumer's employment of SSTs, although its influence decreases over time (Wang, Harris and Patterson, 2013). The construct was identified by Venkatesh and Bala (2008) as having a positive effect on PEOU in TAM3, and this has been confirmed in other SST-based studies (e.g., Blut et al., 2016; Dabholkar and Bagozzi, 2002; Demoulin and Djelassi, 2016). In smartphone-based AR settings it is expected that customers will feel comfortable with their phones when using AR. Therefore, we extend the previous knowledge on self-efficacy into AR settings, as follows. Therefore, the following hypothesis is proposed:

H7. The customer's perceptions of self-efficacy with AR-based SSTs has a positive effect on the perceived ease of use of AR-based SSTs.

Navigation

The previous literature suggests that navigation is a significant determinant of perceived ease of use (e.g., Childers, *et. al.*, 2001). Navigation, in the online context, was defined by Childers *et. al.* (2001, p. 515) as the "process of exploring the interactive environment in alternative ways to seek out product-related information". AR-based SST navigation may be of interest for both online and physical stores. Thus, customers may search for, try on, and order products using only AR applications. In addition, customers might search for, and try on, products through AR, and then buy them in brick and mortar stores. Therefore, AR can also be seen as a complementary element that may trigger the adoption of AR-based SSTs. This complementary view is supported with the so-called “research online purchase offline”, which is driven by curiosity (Beck and Crié, 2018). The diffusion of AR in stores seems more common at this stage of the process of adoption of a new technology because consumers may not be aware of its potential benefits.

Loureiro et al. (2019) identified ease of navigation as a distinctive feature of VR applications. This suggests that navigation type will influence perceived ease of use and perceived usefulness. It has been demonstrated that user-friendly designs (e.g., websites) are important antecedents of enhanced customer productivity; thus, customers understand the importance of usefulness in their search for suitable products and services through effective navigation (Akram, *et al.*, 2017). Consequently, we propose the following:

H8. Navigation has a positive effect on the perceived ease of use of AR-based SSTs.

H9. Navigation has a positive effect on the perceived usefulness of AR-based SSTs.

Technology Readiness

Parasuraman (2000) defined technology readiness as “people’s propensity to embrace and use new technologies for accomplishing goals in home life and at work” (p. 308). Technology readiness has been found by some studies to be an antecedent of SSTs (see the meta-analysis by Blut et al., 2016), but other studies have not supported this due to its multidimensionality. Indeed, some studies have reported low scores for inhibitors, discomfort and insecurity dimensions (Chung, et al., 2015). Motivators, optimism and innovativeness, exert influence through the TAM mediator ease of use (Blut and Wang, 2020). Based on previous findings which showed that motivators had more influence than inhibitors on SST adoption (Blut et al, 2016; 2020), we focused our attention on optimism and innovativeness as variables that might influence AR adoption. Optimism is a mood that may influence perceived ease of use. As posited by Chang and Chen (2021), the individual’s propensity to adopt SSTs may vary based on his/her technology-related personality. Thus, we argue that innovativeness is a kind of trait that has been defined as “a tendency to be a technology pioneer and thought leader” (Parasuraman, 2000, p. 311).

The TRAM proposes that technology readiness has a positive effect on both PU and PEOU (Chung, *et al.*, 2015; Lin, *et al.*, 2007). Taking into account the previous literature, it is proposed that:

H10. Technology readiness has a positive effect on the perceived usefulness of AR-based SSTs.

H11. Technology readiness has a positive effect on the perceived ease of use of AR-based SSTs.

The research model is referred to as the augmented reality in retail model (ARiR Model), as depicted in **Figure 1**.

----**Figure 1.** Proposed ARiR Model----

3. Methodology

The global cosmetics' market has been growing by an average of 4.7% in the last five years (Statista, 2020). As Wedel et al. (2020) posited, AR is a good fit for the pre-purchase and purchase stages of the customer journey. In particular, the use of makeup is based on trials and how it appears on the users' faces. AR-based makeup apps (e.g., Makeup Genius) allow users to try multiple options without applying actual cosmetics directly onto their faces and, thus, to see how they look prior to purchase. We would argue that the makeup industry is a reasonable target on which to test the proposed model. More specifically, Makeup Genius is acknowledged to be an excellent AR app through which to select makeup and apply it to a representation of the user's face (Poushneh, 2018).

Mobile AR-apps enhance retail visits by providing product demonstration capabilities (Dacko, 2017). Based on this previous finding, the context of our study framed consumers to use the AR-app in a store when they visit the cosmetics category. The data were collected from makeup-using women between the ages of 18 and 75 through an online questionnaire. The questionnaire had two sections. In the first part, the participants watched a 2-minute demonstration video edited from L'Oreal Paris USA (2014). The second part consisted of an online questionnaire which assessed eight constructs. The study used the L'Oréal Makeup Genius app (

-----Figure 2). This app allows customers to virtually apply makeup, scan products in-store, and offers product recommendations for each look. A multi-scale item questionnaire was developed to measure the adoption of AR-based SSTs. The items were measured on 5-point Likert scales (1= Totally disagree and 5= Totally agree). The questionnaire included 8 constructs, measured on various scales adapted from previous studies.

-----Table 2 depicts the scales and the items. TR and aesthetics were modelled as second-order reflective constructs.

The online questionnaire was first developed in English based on original scales adopted from previous studies, and was then translated into Spanish by a bilingual researcher. Small adaptations were made to fit the survey context and ensure the questions were understood by the participants. The questionnaires were pre-tested on five individuals to confirm their accuracy and ensure that the questions were understood in both languages.

-----Figure 2 Makeup Genius App----

-----Table 2. Scale Items----

The study explored cross-cultural differences in technology acceptance between a developing (Nicaragua) and a developed country (USA). The proportion of internet users in Nicaragua was estimated to be 46%, and 86.5% in the USA (Internet World Stats, 2019; We Are Social, Hootsuite, and DataReportal, 2019). E-commerce in Nicaragua is not as advanced as in the USA due to infrastructural limitations and the lack of the conditions needed to facilitate its implementation. However, online-sales income has accelerated in recent years, mostly through social media (Privacyshield.gov, n.d.). The data were collected using a snowball social-media based sampling method for Nicaragua. Facebook was chosen because of its high penetration rate, 74.92% (Statcounter, 2020); MTurk and clickworker had very low rates. For the USA, Amazon Mechanical Turk (MTurk) online crowdsourcing platform was chosen.

A total sample of 284 valid responses was collected. Only participants who were regular makeup users were considered. Two screening questions established that the potential participants were regular makeup users and regular online makeup shoppers. As a result, from the 286 respondents, only two were discarded based on missing values and control questions about the intended profile (makeup using women).

4. Data analysis and results

Partial least squares (PLS) was used to test the proposed research model, with SmartPLS 3.0. PLS was preferred as the predictive technique as it has advantages over hierarchical component models (e.g., second-order constructs) (Hair, *et al.*, 2016). The data were checked for outliers, and age and nationality were included as control variables.

4.1 Demographics

The sample consisted of 130 respondents from Nicaragua (46%) and 154 from the USA (54%). The main age groups were 25-39 (41%) and 40-54 (28%). The majority of participants (72.8%) held a first or postgraduate degree. According to The World Bank (2020), in 2018 Nicaragua's population was 6.47M and has a gross national income per capita (GNI) expressed in current international dollars converted by purchasing power parity of $5,540, while the US population was 326.69M, and its GNI per capita was $63,780.

As to their makeup shopping habits, 50% indicated they shopped only in physical stores (vs. 11% online); however, 39% combine physical and online channels. In addition, 65% had used a mobile app or websites to buy makeup at least 1-3 times in the previous year, and 51% have previously tried makeup virtually.

The most used makeup purchasing channel in Nicaragua is physical stores (75%), while for the USA it is a combination of the physical and online (53%). Most USA respondents (79%) used mobile apps or websites to buy makeup; in Nicaragua the figure was 48%. It is noteworthy that 23% of the Nicaraguan respondents used virtual makeup apps on a monthly basis (vs 9% for the USA); however, around half of the respondents in both subgroups indicated they had never tried virtual makeup apps (USA 47%; Nicaragua 50%).

4.2 Measurement Model

To ensure the equivalence of the two groups the reliability and validity of the multi-item scales was assessed for each group. Given that the results were similar only the results of the sample as a whole are presented. Internal consistency (Cronbach's *alpha*), factor loadings, composite reliability (CR), and average variance extracted (AVE) (Freeze and Raschke, 2007), are depicted in

---Table 3. Due to low loading values that affected internal reliability, some items were deleted, as suggested by Hair *et. al.* (2010). The results confirmed the model's convergent validity as all constructs showed a good level of reliability, with Cronbach's *alpha* and composite reliability being greater than 0.7 (Hulland, 1999; Nunnally, 1978). The AVEs also had good levels, with values greater than 0.5 for all constructs (Fornell and Larcker, 1981). Discriminant validity was tested using item cross-loadings and the Fornell and Larcker criterion (1981), which indicates that a construct should share more variance with its indicators than with other constructs (Chin, 1998). The values of the correlations were significant (p<0.01), except for need for personal interaction (NEED) and most of the other constructs under study. **---Table 3** includes results for second order constructs AES and TR. For both second order constructs, aesthetics and TR, reliability, convergent validity and discriminant validity were confirmed as suggested by Hair et al. (2017) and Sarstedt et. al (2019).

---**Table 3.** Reliability and Validity of the Measurement Model---

A Harman's single factor test (Podsakoff and Organ, 1986) and a full collinearity test (Kock, 2015) were conducted to assess common method bias (CMB). The Harman's single factor test showed that the unrotated factor accounts for less than 50% of variance (specifically, 34.12%). A dummy variable criterion was used in the full collinearity test; all variance inflation factors (VIFs) were lower than 3.3 (**----Table 4**). Thus, both tests confirmed CMB is not a concern in the model.

----**Table 4.** Full collinearity estimates----

4.3 Structural Model

A standard PLS algorithm and a bootstrapping procedure were used to assess the proposed ARiR model; a repeated indicator method was employed for two reasons: (i) The model includes two second-order constructs (AES and TR) unaffected by other predictors in the model (Becker, et al., 2012; Chin, et al., 2003), (ii) PLS performs well with limited samples (Aldás, 2016). Bootstrapping with 1000 resamples was used to assess the significance of the path coefficients (Henseler, et al., 2009).

The PLS-SEM results (**---Table 5)** show that ATT was significantly influenced by PU (Nic: $\beta=0.649$, $p<0.01$; USA: $\beta=0.664$, $p<0.01$), supporting H3 for both samples. PEOU (USA: $\beta=0.167$, $p<0.05$) significantly influenced ATT for the USA sample; however, in the Nicaraguan sample PEOU (Nic: $\beta=0.149$, $p>0.05$), it was not significant. Thus, H2 was only supported for the USA sample, and PU was found to have a stronger influence than PEOU on ATT.

PU was significantly influenced by AES (Nic: $\beta=0.536$, $p<0.01$; USA: $\beta=0.363$, $p<0.01$) and by NAV (Nic: $\beta=0.254$, $p<0.05$; USA: $\beta=0.368$, $p<0.01$); therefore, H4 and H9 were supported for both samples. However, constructs PEOU (Nic: $\beta=0.061$, $p>0.05$; USA: $\beta=0.076$, $p>0.05$), NEED (Nic: $\beta= -0.106$, $p>0.05$; USA: $\beta= 0.007$, $p>0.05$) and TR (Nic: $\beta=0.052$, $p>0.05$; USA: $\beta= 0.069$, $p>0.05$) did not influence PU significantly; thus, H1, H6 and H10 were not supported. The construct PEOU was significantly influenced, in both samples, by AES (Nic: Nic: $\beta=0.385$, $p<0.01$; USA: $\beta=0.3$, $p<0.01$) and SE (Nic: $\beta=0.286$, $p<0.01$; USA: $\beta=0.401$, $p<0.01$), supporting H5 and H7. The construct NAV (Nic: $\beta=0.056$, $p>0.05$; USA: $\beta=0.252$, $p<0.01$) was not found to significantly influence PEOU in the Nicaraguan sample; thus, H8 was only supported for the USA sample. TR (Nic: $\beta=0.077$, $p>0.05$; USA: $\beta=-0.03$, $p>0.05$) did not have a significant effect on PEOU; therefore, H11 was not supported.

Nationality and age were included as control variables to test the relationships with the independent and dependent variables. Nationality had a significant effect on perceived usefulness ($\beta=0.09$, $p<0.05$), self-efficacy ($\beta= - 0.18$, $p<0.05$), navigation ($\beta=0.32$, $p<0.01$), need for interaction ($\beta=0.405$, $p<0.01$), and technology readiness ($\beta= - 20$, $p<0.05$). Age had a significant effect on aesthetics ($\beta=0.197$, $p<0.05$), navigation ($\beta=0.145$, $p<0.05$), and perceived ease of use ($\beta= - 0.127$, $p<0.05$).

The values of the percentage of explained variance (R^2) in the PLS path models can be described as substantial (0.67), moderate (0.33), and weak (0.19) (Chin, 1998). For the Nicaraguan sample, the proposed model explains 63.6% of the variance of PU, 44.5% of

PEOU, and 54.5% of ATT. For the USA sample, the model explains 55% of the variance of PU, 54% of PEOU, and 58.4% of ATT.

To confirm the predictive relevance of the proposed model, a blindfolding procedure was performed to evaluate Stone-Geisser's cross-validated redundancy. For both samples, the Q^2 was >0 (---**Table 5** PLS-SEM Hypotheses Testing Results by nationality**---Table 5)**, which confirms the predictive relevance of the proposed model (Hair, et al., 2016; Henseler, et al., 2009). Based on Henseler et al. (2009), the model has large predictive relevance for ATT (Nic: Q^2=0.409; USA: 0.468) and PU (Nic: Q^2=0.473; USA: Q^2=0.405). For the USA sample, the predictive relevance for PEOU (Nic: Q^2=0.257; USA: Q^2=0.37) is large, and for Nicaragua medium. The structural model and the results of the hypotheses testing are in **---Figure 3**.

---**Table 5** PLS-SEM Hypotheses Testing Results by nationality---

---**Figure 3.** Structural Model Testing ---

4.3 Differences between Countries

To compare attitudes between the respondents from both countries an independent sample t-test, using SPSS software, was performed. The results of the t-test indicated statistically significant differences for visual appeal, self-efficacy, TR, optimism, need for personal interaction, and navigation. The USA respondents had a more positive perception of the visual appeal (t=-3.626, p<0.001) elements of the AR-based SST than did the Nicaraguan ($\bar{x}$ = 4.50 and 4.16, respectively). Regarding self-efficacy (t=-2.842, p<0.005), the USA respondents considered themselves more confident with technology than did the Nicaraguan ($\bar{x}$ = 4.63 and 4.39), which is consistent with the technological development of the respective countries. This matches the results for TR (t=-2.722, p<0.005) and optimism (t=-2.926, p<0.005), where the USA respondents had higher means.

As for the need for personal interaction (t=6.895, p<0.001), the Nicaraguans tended to consider it more important ($\bar{x}$ = 3.82) than did the USA respondents ($\bar{x}$ = 2.90); this might be explained by the different levels of individualism in each country. As for in-store navigation using AR-based SSTs (t=4.422, p<0.001), the Nicaraguans had a more positive perception ($\bar{x}$ = 4.32) than did the USA respondents ($\bar{x}$ = 3.88). However, the influence of navigation on PEOU was only supported for the USA sample. These two differences may be attributed to cultural factors. As for the other constructs, including overall attitude, the differences between the Nicaraguan and USA respondents were not statistically significant.

5. Discussion and Implications

The main purpose of this study is to determine the factors that influence customers' acceptance of AR-based SSTs. The findings confirmed that PU and PEOU are antecedent constructs of attitude. Thus, the study provides significant insight for marketers, given that it fulfils the objective of better explaining PU and PEOU.

It is also important to note that, contrary to previous studies, perceived ease of use was not found to have a significant effect on perceived usefulness. This can be explained by the sample's demographics. Thus, the majority of the participants can be considered as young and actual users of technology. Therefore, mobile apps and innovative technologies are today commonly used in daily life, which reduces perceptions of difficulty. Thus, users do not consider perceived ease of use as a relevant factor in terms of the usefulness of SSTs.

Aesthetics and navigation were found to be strong predictors of perceived usefulness. This suggests that the perceived usefulness of AR is affected by hedonic motivations (i.e., the visual appeal and entertainment aspects provided by AR) and the utilitarian motivation of improving in-store navigation during shopping. These results suggest that mobiles apps, such as AR, do not provide users with value from a cognitive viewpoint. However, both PU and PEOU have an effect on users' attitudes towards AR.

TR was found to influence neither PU nor PEOU. This may be because the ARiR model includes other antecedent constructs of PU and PEOU that are stronger predictors than TR. The study findings indicated that self-efficacy is a significant predictor of PEOU. This suggests that customers' self-confidence in their ability to use a specific device, or platform, influences their perception about its degree of difficulty.

The cross-cultural comparison showed that the USA respondents considered themselves more confident in their use of technology, and that they found the AR app more visually appealing. On the other hand, the Nicaraguans customers gave more importance to their personal interactions with employees and considered the AR app more positively in terms of enhanced in-store navigation. The study confirmed the application of the proposed model in both a developed and a developing country, and provides guidelines for planning implementations of AR in self-service options.

AR-based SST seems a complementary tool for enhancing value in retailing in two ways. First, it enhances the capability of product demonstration in the store (Dacko, 2017). This is of special interest in products that need multiple try-ons, such as cosmetics, clothing, shoes, or apparels when customizing the trials (Perannagari and Chakrabarti, 2020). Physical try-on of cosmetics is facing disadvantage of subsequent trials because each trial leaves a stamp in faces, lips, or eyelashes that requires cleaning. Further, multiple users of products such as creams or color face are touched by multiple consumers that may result in unsafety, especially during the COVID-19. Second, the omnichannel approach is challenging retailing (Thaichon, Phau, and Weaven, 2021; Verhoef, Kannan, and Inman, 2015). Integrating AR in the omnichannel perspective is pursued by retailers or brands by creating aisles or similar spaces for "merging the touch-and-feel of the physical world with highly vivid, customized and connected digital content" (Hilken et al., 2018; p. 512). A growing number of retailers (e.g., Walgreens) and brands (e.g., cars, apparel) are implementing AR apps at the point of sale for enhancing the customer experiences or showing the entire assortment. Also, restaurants provide AR menus aiming at a highly vivid environment (e.g., Menu AR or AR Food). In this sense, Hilken et al. (2018) provide adequate theoretical support for integrating AR in the omnichannel perspective through the situated cognition theory that enables embedded, embodied, and extended customer responses. Literature claims for future research on such integration (Hilken et al., 2018; Perannagari and Chakrabarti, 2020).

The findings provide insights for retailers into the key relationships they should consider when implementing AR-based SSTs. Thus, the results for influence of perceived usefulness on attitude confirmed that the more useful that customers perceive AR-based SSTs, the more value they represent. As previously discussed, customers expect utilitarian benefits from self-service options. Thus, retailers must carefully consider the features of AR-based SSTs, given that customers very much take into consideration if they will enhance, and be useful, in their shopping experiences, rather than be wasted effort.

The influence of perceived ease of use on customers' attitudes suggests platforms should be adapted to customers; thus, retailers should develop strategies to familiarise their clients and encourage the transition to self-service options.

Makeup decisions are often based on trials of colour type and ways of applying it to the user's face. AR-based SSTs provide an excellent opportunity to display these actions with continuous changes, minimum effort and without using physical products (e.g., free samples) and facial cleansers.

The limitations in developing countries due to infrastructure and level of economic development should be considered. For example, customers might want to use, and be capable of using, AR-based SSTs, but companies might have to provide devices in-store (e.g., tablets, displays, smart mirrors, WiFi).

6. Conclusions, Limitations, and Further Research

In the face of technological advances and changing customer lifestyles and expectations, retailers need to adapt and make good use of these technologies. SSTs provide easier and more convenient options for customer-company interaction.

This paper proposes an AR-based SST model, the ARiR, that has been tested in the makeup industry. The analyses supported 5 of the 11 hypotheses for the Nicaraguan sample and 7 for the USA sample, as shown in Table 5. The study provides a better explanation of the variance of PU (Nic = 63.6%; USA = 55%) and PEOU (Nic = 44.5%; USA = 54%). Moreover, the aesthetics of the AR app were found to trigger perceived usefulness and perceived ease of use. The navigation process also affected both variables. However, the relationship between navigation and perceived ease of use was not supported for the Nicaraguan sample. Self-efficacy positively influences perceived ease of use, as expected.

The present study also revealed that there was no relationship between need for personal interaction and perceived usefulness. This finding suggests that consumers feel independent in using the APP for product try-on. Contrary to our expectations, the two dimensions of technological readiness (i.e., innovativeness and optimism) did not exert influence on perceived usefulness nor perceived ease of use. These results can be interpreted in two complementary directions. Innovativeness captured how advanced consumers feel in using the latest technology. Moreover, optimism captured how consumers felt about the benefit of technologies in their daily consumption activities. It seems that the participants of both countries were not so advanced in the technologies of their interest. Indeed, technology readiness was scored 3.65 in Nicaragua and 3.86 in the US on a 5-point

Likert scale. A general interpretation of the latest results may suggest that albeit AR can be considered as novel technology, the use of a common device such as a smartphone for accessing apps, reduces its perceived usage complexity. In fact, the high rate of mobile access in both countries (The World Bank (2021) and the high access to social media via mobile (Hootsuite Datareportal, 2020) may favor the perception of AR-based SSTs as a common current technology, even more than initially expected. Indeed, the recent report of American Customer Satisfaction Index for the US suggests for health and personal care stores, “mobile apps improve as customers come to rely more on digital process” (ACSI, 2021; p.10).

Overall, the model was found to explain 54.5% and 58.4% of the total variance of the attitude towards AR-based SSTs, for Nicaragua and the USA respectively, with a large prediction relevance for both samples. Since our aim was to determine the factors that influence customers’ acceptance of AR-based SSTs applicable for both developed and developing countries, our results show similarities except in two hypotheses, H2 and H8, while the rest of the relationships show the same type of influence. Thus, the influence of perceived ease of use on attitude (H2) is not confirmed in Nicaragua. This might be attributed to the lesser level of usage of AR in such a country. As regards the non-significant influence of navigation on perceived ease of use of AR-based SSTs (H8) in Nicaragua, this can be interpreted because of the type of cosmetics retailers.

These results are suggesting implications for retailers in different aspects. First, since present study revealed that there was no relationship between need for personal interaction and perceived usefulness, AR can be seen a complementary distribution channel that enhances the customer journey. Furthermore, it opens up two research avenues: (i) the complementarity between AR-based SSTs and in-store personal interactions; (ii) which stages of the customer journey fit better with SSTs.

Second, retailers need to develop user-friendly designs for AR-based SSTs and identify which utilitarian and hedonic motivations their customers will value the most. They should provide appealing designs and entertaining content for their AR apps. In addition, the AR-based features should be complemented by effective navigation systems. Related body-based AR applications can benefit from our study. For instance, virtual try on applications for glasses (e.g., https://www.misterspex.co.uk/l/pg/100508), shoes (e.g., Wanna Wicks App), watches (e.g., AR-watches), and social media platforms such as Snapchat (see

Kohl's) and Instagram that offer AR filters that allow users to experiment with their facial appearance, using elements such as puppy dog ears and makeup styles. Future studies might test the model in other industries with spatial-based AR apps, for example, furniture (e.g., Ikea), interior design (e.g., Houzz), tool and equipment suppliers (e.g., Home Depot), hotels and destinations (e.g., Marriott), and with other SSTs, such as virtual and mixed reality.

Third, the antecedent factors identified in this study will help retailers focus on the ones that result more important for their customers. By understanding how the relationships between factors are influenced, retailers could use the results of this study to determine the level of integration between offline and online settings they want to offer their customers and the level of acceptance certain features for these apps might have. This model allows managers to have a clearer view of what aspects to consider when developing this type of technology. Since AR is redefining retail in the pandemic (Papagiannis, 2020), it is expected that the adoption of these AR-based SSTs will grow. In this sense, companies are forced to know their customers, and their technological skills, in order to develop suitable strategies for the acceptance of AR-based SSTs.

This study is limited in that the app was perceived through a video that demonstrated the AR-based SST. It is recommended that future studies be conducted in physical stores with customers using the technology in real shopping experiences (Yuan *et al*., 2021). This will reduce any bias in the results, given that the study used active internet users, who might be more accepting of new technologies. Future AR adoption research should compare how consumers behave in private (e.g., at home) and in public (e.g., in-store) spaces. This research can be aligned with the idea of the inner and wider contexts of AR suggested by Scholz and Duffy (2018), and analyses its implications from an omnichannel perspective.

The choice of the AR app video was limited and did not cover the broad scope of the possible features of this technology type. Although the percentage of active social media users access via mobile is high in both countries, Nicaragua, 99%, and the US, 98% (Hootsuite Datareportal, 2020), the study did not control for the device used for answering the survey.

The study, in contrast to others, showed that the influence of TR on PU and PEOU was not significant. It is suggested that TR and its dimensions be further investigated in terms of the adoption of AR-based SSTs. Future research can build on this study using different products and countries. Furthermore, the model can be extended to VR and virtual commerce. Additional relevant antecedent constructs could be included to extend the model's applicability in other industries. Future research might examine other immersive experiences based on VR, and on wearable-based mixed reality. These might find that absence of previous experience in using new wearable devices (e.g. head-mounted display glasses) exerts an influence. VR in the retail context is designed to evoke affective responses through the development of appealing and stimulating virtual environments that increase purchase intentions; combined VR and AR technologies have the potential to enhance the customer experience (Martínez-Navarro, *et al.*, 2019) through appealing navigation as part of the customer experience. Therefore, future studies may address the customer experience of using VR and AR at the store.

Likewise, future research might analyse how AR and VR settings could mitigate the negative effects of the pandemic in the pre-purchase and purchase stages of the customer journey by means of virtual try-ons, smart mirrors, and simulated environments,

Lastly, the use of AR-based SSTs raises new issues related to customer privacy. Thus, companies might, without the consumers' permission, conduct multiple trials of makeup combined with machine learning techniques to target specific groups. As Poushneh (2018) posited in discussing AR in retail, the ability to control access to personal data affects the user's satisfaction.

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FIGURES

Figure 1. Proposed ARiR Model

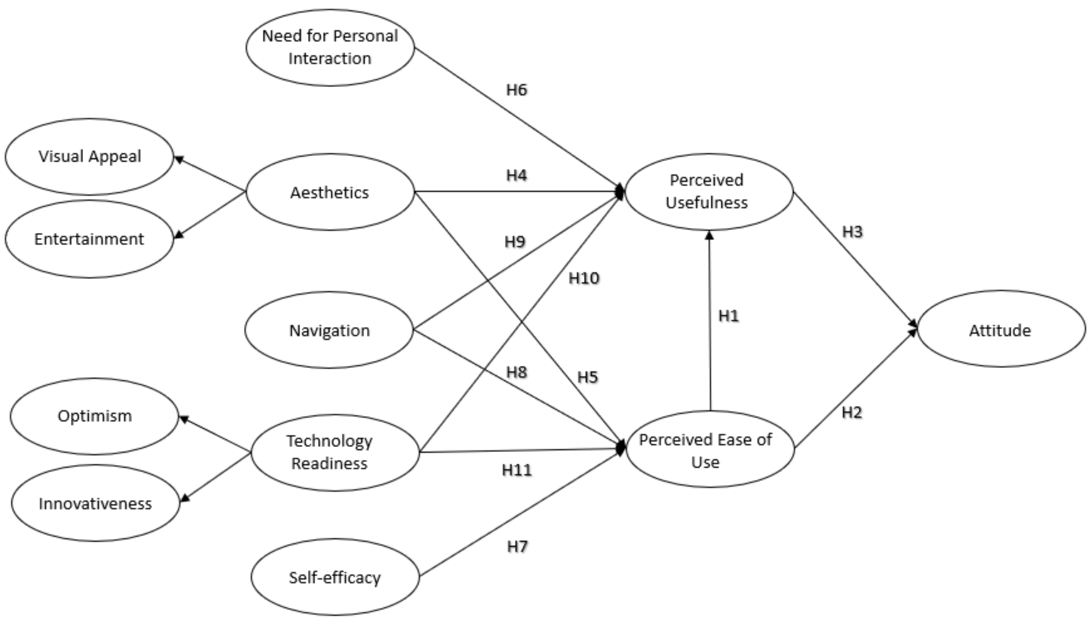
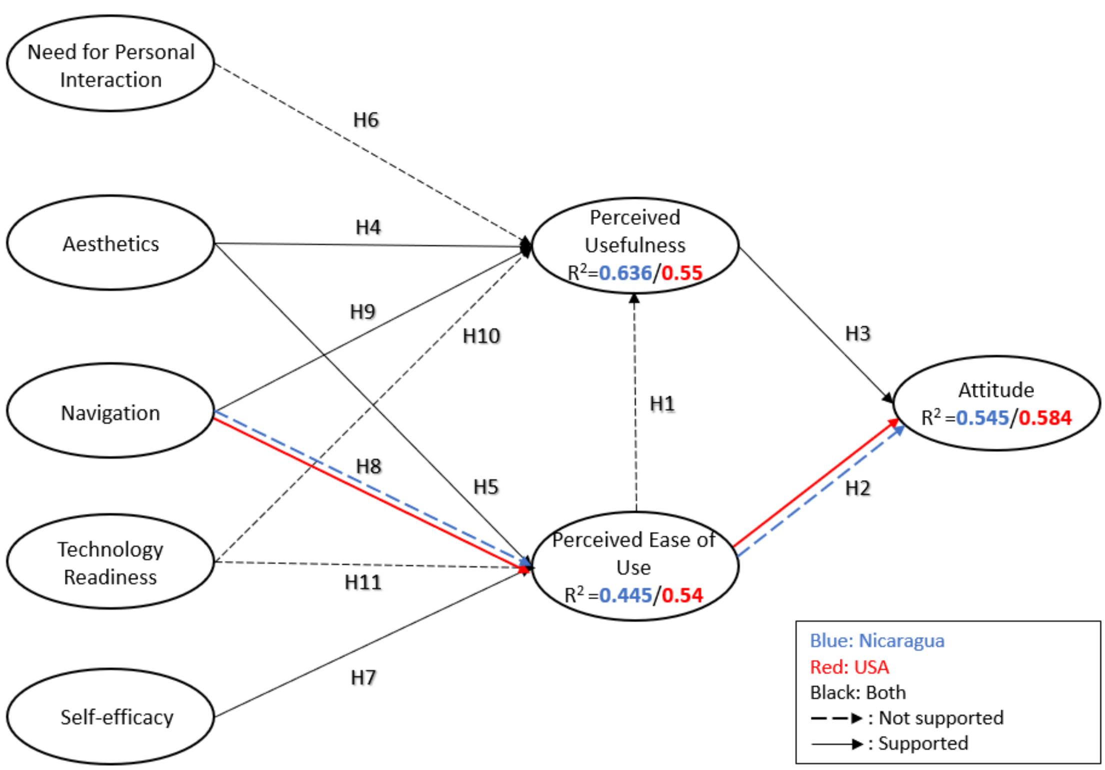


Figure 2 Makeup Genius App

Source: Mohanty (2015)

Figure 3. Structural Model Testing



TABLES

Table 1. Previous Technology Acceptance Research

Authors	Technology	Constructs	Model
(Childers, *et al.*, 2001)	Interactive Online Shopping	Navigation, convenience, sub-experience, PU, PEOU, PE, ATT.	TAM
(Kim and Forsythe, 2008)	Virtual Try-on	Technology anxiety, innovativeness, PU, PEOU, perceived entertainment, ATT, BI, post-use evaluation.	TAM
(Rese, *et al.*, 2014)	AR: IKEA catalogue app	PI, PE, PU, PEOU, ATT, BI.	TAM
(Huang and Liao, 2015)	AR: Online shopping with virtual fitting	Presence, PEOU, PU, perceived aesthetics, service excellence, perceived playfulness, sustainable relationship behaviour.	TAM
(Javornik, *et al.*, 2016)	AR: Virtual makeup try-on Magic Mirror	Perceived augmentation, playfulness, convenience, BI	–
(Rese, *et al.*, 2017)	AR: AUTO BILD app, IKEA Catalogue app, Virtual Mirror app	PI, PE, PU, PEOU, ATT, BI	TAM

Note: PU= perceived usefulness, PEOU= perceived ease of use, PE= perceived enjoyment, ATT= attitude, PI = perceived informativeness, BI = behavioural intention

Table 2. Scale Items

Construct	Items	Sources
PEOU	**PEOU_1** The interaction with the AR app is clear and understandable. **PEOU_2** The interaction with the AR app does not require a lot of mental effort. **PEOU_3** I find the AR app easy to use. **PEOU_4** I find it easy to get the AR app to do what I want.	(Venkatesh and Bala, 2008)
PU	**PU_1** Using the AR app would improve my shopping performance. (e.g., save time or money). **PU_2** Using the AR app would increase my shopping productivity. (e.g., make purchase decisions or find product information within the shortest time frame). **PU_3** Using the AR app would enhance my shopping effectiveness. (e.g., get the best deal or find the most product information). **PU_4** I find AR apps useful when shopping.	(Chen, *et. al.*, 2002; Venkatesh and Bala, 2008)
AES	**VA_1** The way the AR app displays products is attractive. **VA_2** The AR app is aesthetically appealing. **VA_3** I like the look of the AR. **ENT_1** Using the AR app to shop is very entertaining. **ENT_2** I am enthusiastic about using the AR app to shop; it picks me up. **ENT_3** The AR app doesn't just sell products-it entertains me.	(Mathwick, *et al.*, 2001)
NEED	**NEED_1** Human contact when shopping makes the process enjoyable for the customer. **NEED_2** I like interacting with the people who provide in-store service. **NEED_3** The personal attention of service employees is not very important to me (Reverse Coded). * **NEED_4** I do not like using a machine when I could talk instead to a person. *	(Dabholkar, 1996)
SE	**SE_1** I could use the AR app if someone showed me how. * **SE_2** I could use the AR app if there was nobody to tell me what to do. **SE_3** I am confident in my ability to use the AR app.	(Demoulin and Djelassi, 2016)
NAV	**NAV_1** Using the AR app would allow me flexibility in finding information in-store. **NAV_2** Using the AR app would offer me a very free environment in which I could navigate as I saw fit. **NAV_3** Using the AR app would allow me to navigate in the physical store. **NAV_4** Using the AR app would allow me to move freely in the physical store.	(Childers, *et al.*, 2001)
TR	**OPT_1** Technology gives people more control of their daily lives.	(Chung, *et al.*, 2015)

	OPT_2 Products and services that use the newest technologies are much more convenient to use. **OPT_3** I prefer to use the most advanced technologies available. **OPT_4** Technology makes me more efficient when shopping. **OPT_5** Technology gives me more freedom and mobility. **INN_1** In general, I am among the first in my circle of friends to acquire new technologies when they appear. **INN_2** I can usually figure out how to use new high-tech products and services without help from others. **INN_3** I keep up with the latest technological developments in my areas of interest. **INN_4** I enjoy the challenge of figuring out how to use high-tech gadgets. **INN_5** I have fewer problems than others in making technology work for me.	
ATT	**ATT_1** Using an AR app to shop is a good idea. **ATT_2** The AR app would make my shopping experience more interesting. **ATT_3** Using the AR application makes shopping more fun.	(Chung, *et al.*, 2015)

Note: *Items deleted from the final scale as reported in the results section.

PEOU: perceived ease of use. PU: perceived usefulness. AES: aesthetics. VA: visual appeal. ENT: entertainment. NEED: need for personal interaction. SE: self-efficacy. NAV: navigation. TR: technology readiness. OPT: optimism. INN: innovativeness. ATT: attitude.

Table 3. Reliability and Validity of the Measurement Model

Construct	Dimension	Label	Items	Loadings	Cronbach's *alpha* >.7	Composite Reliability >.7	AVE >.5
Attitude		ATT	ATT_1	0.905	0.893	0.933	0.823
			ATT_2	0.924			
			ATT_3	0.893			
Aesthetics	Entertainment	AES	ENT_1	0.896	0.856	0.913	0.778
			ENT_2	0.925			
			ENT_3	0.821			
	Visual appeal		VA_1	0.888	0.907	0.942	0.843
			VA_2	0.949			
			VA_3	0.917			
Navigation		NAV	NAV_1	0.868	0.9	0.93	0.769
			NAV_2	0.863			
			NAV_3	0.873			
			NAV_4	0.903			
Need for personal interaction		NEED	NEED_1	0.972	0.885	0.942	0.891
			NEED_2	0.915			
Perceived ease of use		PEOU	PEOU_1	0.831	0.882	0.918	0.738
			PEOU_2	0.825			
			PEOU_3	0.883			
			PEOU_4	0.894			
Perceived usefulness		PU	PU_1	0.925	0.931	0.951	0.828
			PU_2	0.918			
			PU_3	0.885			
			PU_4	0.912			
Self-efficacy		SE	SE_2	0.94	0.87	0.939	0.885

			SE_3	0.941			
Technology readiness	Innovativeness	TR	INN_1	0.671			
			INN_2	0.795			
			INN_3	0.844	0.842	0.889	0.616
			INN_4	0.809			
			INN_5	0.795			
	Optimism		OPT_1	0.783			
			OPT_2	0.733			
			OPT_3	0.818	0.818	0.873	0.579
			OPT_4	0.743			
			OPT_5	0.723			
Second Order Measurement Model							
Aesthetics	Entertainment	AES	ENT_1	0.77			
			ENT_2	0.848			
			ENT_3	0.691	0.881	0.91	0.628
	Visual appeal		VA_1	0.806			
			VA_2	0.812			
			VA_3	0.82			
Technology readiness	Innovativeness	TR	INN_1	0.671			
			INN_2	0.795			
			INN_3	0.844			
			INN_4	0.809			
			INN_5	0.795	0.856	0.886	0.438
	Optimism		OPT_1	0.783			
			OPT_2	0.733			
			OPT_3	0.818			
			OPT_4	0.743			

OPT_5	0.723

Table 4. Full collinearity estimates

Construct	VIF
Aesthetics	1.916
Attitude	3.048
Navigation	2.054
Need for personal interaction	1.141
Perceived ease of use	1.441
Perceived usefulness	2.339
Self-efficacy	1.18
Technology readiness	1.225

Table 5. PLS-SEM Hypotheses Testing Results by nationality

Hypothesis	Relationship	Path Coefficients	t-Values	Result

		Nicaragua	USA	Nicaragua	USA	Nicaragua	USA
H1	PEOU → PU	0.061	0.076	0.884	0.894	Not supported	
H2	PEOU → ATT	0.149	0.167*	1.439	2.167	Not supported	Supported
H3	PU → ATT	0.649**	0.664**	5.544	11.41	Supported	
H4	AES → PU	0.536**	0.363**	4.981	4.934	Supported	
H5	AES → PEOU	0.385**	0.3**	3.748	3.357	Supported	
H6	NEED → PU	-0.106	0.007	1.725	0.122	Not Supported	
H7	SE → PEOU	0.286**	0.401**	2.972	5.303	Supported	
H8	NAV → PEOU	0.056	0.252**	0.519	2.98	Not Supported	Supported
H9	NAV → PU	0.254*	0.368**	2.218	3.817	Supported	
H10	TR → PU	0.052	0.069	0.937	0.989	Not Supported	
H11	TR → PEOU	0.077	-0.03	1.116	0.499	Not Supported	

Nicaragua	USA
R^2 (PU) = 0.636; R^2 (PEOU) = 0.445; R^2 (ATT) = 0.545	R^2 (PU) = 0.55; R^2 (PEOU) = 0.54; R^2 (ATT) = 0.584
Q^2 (PU) = 0.473; Q^2 (PEOU) = 0.257; Q^2 (ATT) = 0.409	Q^2 (PU) = 0.405; Q^2 (PEOU) = 0.37; Q^2 (ATT) = 0.468

** $p<0.01$; *$p<0.05$

Note: PEOU: perceived ease of use. PU: perceived usefulness. AES: aesthetics. NEED: need for personal interaction. SE: self-efficacy. NAV: navigation. TR: technology readiness. ATT: attitude.