

THE INTENTION OF CONSUMERS TO USE AUGMENTED REALITY APPS IN GASTRONOMY - CASE OF MÁLAGA

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Abstract

The intention to use mobile applications with augmented reality is analyzed in order to assess which variables have the greatest influence on their use by consumers. The UTAUT-2 model has been used, analyzing: performance expectancy, effort expectancy, social influence, hedonic motivation, price value, facilitating conditions, habit and behavioral intention.

The results show that predictors of a more social nature, such as aspects associated with perceived enjoyment, habits and social influence are more unstable for the model, as well as the weight of social influence.

Also, the hypothesis on the value of price could not be supported; since most augmented reality applications are free, although it is a variable that exerts a positive influence on the intention to use because of the perceived benefits.

The demographic profiles of consumers can also become important predictors when using augmented reality apps, being the millennial generation and generation Z the most likely to use mobile devices with augmented reality.

Keywords: Augmented reality, mobile applications, behavioral intention, UTAUT-2 model, consumer behaviour, experiential communication.

1. Introduction

In a highly competitive and globalized sector such as tourism and specifically the hospitality industry, Spain's tourism leadership is at a crossroads in the present and needs new strategies for the future.

Malaga, the Andalusian capital of the Costa del Sol, seeks as a tourist engine, needs new formulas for reversing the situation as soon as possible, and of attracting tourists again, when a complex context is suffered, the true capacity of intellectual survival of the human being arises to reinvent itself.

Specifically, in hostels and restaurants, the power of knowing how to differentiate yourself from others is what can radically change the success of the company. Part of the ability to survive depends on knowing how to understand the needs of consumers and meet them widely. For instance; through the augmented reality of a menu, an immersive, practical and playful experience can be produced that drives demand in a restaurant to create a city experience, building a brand capable of generating an attractive cluster that attracts an important visitor's flow. That's can be done with mobile applications technology.

The goals that this research proposes are:

- Evaluate the intention to use mobile applications with augmented reality
- Study their influence on the purchase decision, their habit, the degree of difficulty appreciated, the social influence and the perception of value.

Context on the hospitality industry in Malaga

The gastronomic and touristic sector of the city of Malaga is unquestionable, as is the dependence of the city's economy. It is a deeply rooted Mediterranean business culture that is already part of the idiosyncrasy of the territory. For this reason, when such an unexpected scenario as COVID-19 broke out, the culture and economic soul of the city were seriously affected. However, these adverse contexts have also served to rethink the weaknesses of the sector, which, due to the inertia of the activity itself, were not adequately addressed. In fact, the Strategic Plan of the City of Malaga (2021-2024) already takes into account that it must reposition the positioning of Malaga as a gastronomic destination. The actions included extending a development plan for the enogastronomic segment, through the promotion of the Malaga local products and the creation of an international haute cuisine brand image related to the philosophy and trend of consuming local product of the primary sector.

At present, in a much more optimistic and hopeful environment regarding the pandemic, Malaga is gradually recovering, and the work to strengthen the sector continues its course. In the middle of this year, Malaga formally presented its candidacy to be Unesco Creative Capital in Gastronomy and with the ambitious objective of being a world reference and spreading food culture, and promoting the consumption of agri-food products.

In all this context, a gap is made for technological innovation, because in all large or small changes, technology always intervenes. Malaga is looking for new formulas that generate synergies with other economic activities. Although the use of immersive technology seems to have become popular in the last decade, the truth is that the city's hoteliers have not yet opted for an immersive technology that feeds visitors their thirst for different experiences. For this reason, it is proposed to open the door to a

competitive advantage, to a hospitality cluster, which changes the scene and sets a new roadmap according to the interests of the new demand and generations.

The 3,411 hospitality establishments in the province of Malaga, which are been substrated from a database (DEEPFO, 2021), is a good indication to establish an overall strategy, of a technological nature, that is capable of generating a qualitative leap in terms of which refers to the hospitality industry. Below this, is an analysis of the intention to use mobile applications with augmented reality.

All this seems to indicate that part of the success of a project such as the creation of a mobile application of augmented reality passes, inexcusably, to also know the use that exists for a certain technology.

2. Theoretical background

2.1. The importance of technology in the tourism sector

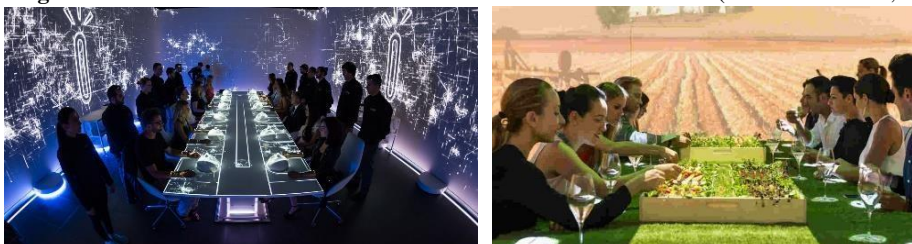
The hospitality industry, like any other sector or business activity, requires the implementation of technological systems, not only for an efficient improvement of resources, but also to adopt measures that facilitate work, improve service or maximize profits. Digitization is cited in hospitality business as a process that allows increasing performance, improving productivity, saving time and money and converting the destination to more sustainable.

Technology has also allowed the hospitality industry to create more immersive and sui generis experiences for increasingly demanding experiential tourists.

Sublimotion restaurant in Ibiza is an example of the use of the technology to create different experiences, that combines several services to generate a unique experience, mixing technology and gastronomy. The concept of restaurant plus emotion, creating a visual spectacle, a sensory journey, based on a scenography, an illusion, a design, an architecture, a choreography and a high gastronomic quality.

Dinners can enjoy a radical, revolutionary and unique three-dimensional gastronomic show, and also taste a menu prepared by Paco Roncero, a renowned chef who has two Michelin stars (Villalba, 2015).

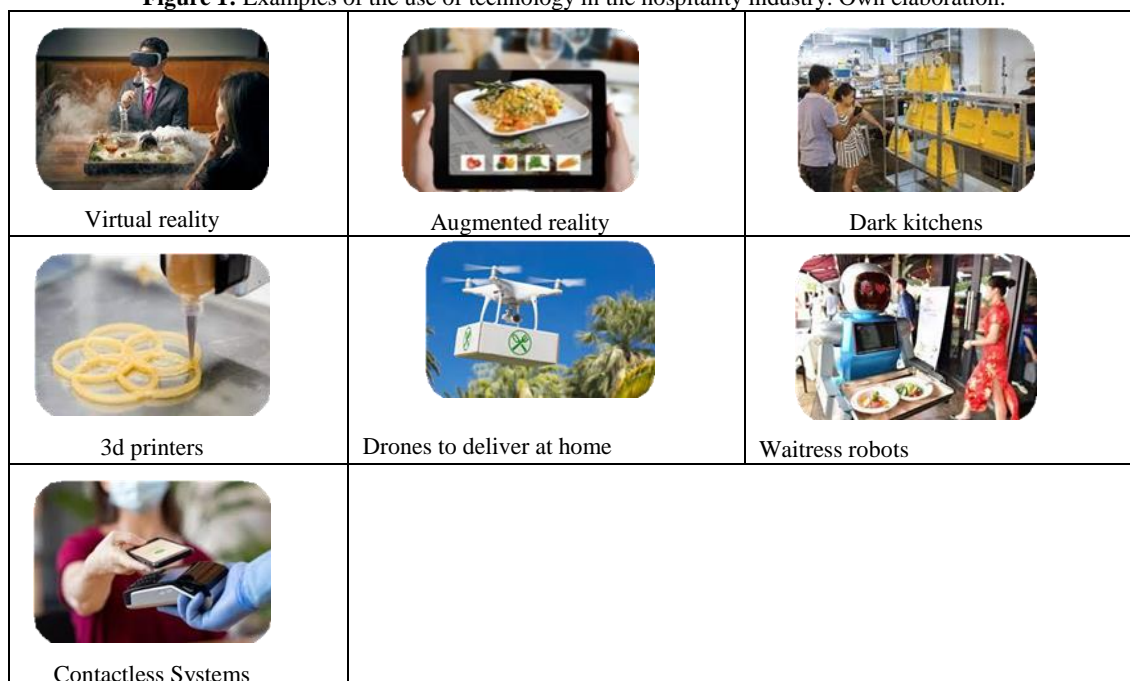
Image 1: Different chromatic environments in the Sublimotion restaurant. (Sublimotionibiza,2022)



Part of the ability to survive depends on knowing how to understand the needs of consumers and meet them widely.

The advantages of technology are multiple: improving payment methods, new applications, automation of processes, obtaining and processing information, etc...

Figure 1: Examples of the use of technology in the hospitality industry. Own elaboration.



Although gastronomy seems to continue to lead the backbone of the activity, the possibilities of offering added value to customers or a complementary leisure experience through, for example, a service or a show are great attractions for a sector that constantly seeks to obtain advantages competitive within the tourism industry itself. Whether it is the way customers search, compare, pay for their dishes or the way restaurants interact with customers, the truth is that technology is changing the experience of a restaurant. Customer satisfaction in restaurants is also influenced by technology, so customers interact with and can influence others, as well as if they are satisfied, return to the restaurant (Annaraud & Berezina, 2020).

2.2 Augmented reality

Virtual reality (VR) and Augmented Reality (AR) have been including the feeling of telepresence and we it grows the number of applications in tourism, restaurants and destinations (Loureiro, Guerreiro & Ali, 2020)

Due to the experiential trend of the new generations of tourists, it has been decided to emphasize the study of the intention to use mobile applications with augmented reality in the hospitality industry.

Augmented reality is increasing due to the proliferation and use of smartphones in our daily lives. Usings applications helps of better understanding consumer behavior and generating large volumes of information that are translated in valuable consumption patterns by companies helping and improving the user experience (Panou, Ragia, Dimelli & Mania, 2018).

Also, it has been applied in the planning and creation of tourism experiences, as summarized in the study conducted by Loureiro, Guerreiro & Ali, 2020; where a citation network analysis of 56 journal articles and 325 conference proceedings related to VR and RA in the context of tourism had been performed, demonstrating for example that tourists will feel immersed in situations through virtual reality, therefore behavior can be analyzed in a more real way than by a survey where they try to put the respondent in a situation. Yung & Khoo-Lattimore, (2019) made also a

systematic literature review on VR/ AR research in tourism, finding 46 manuscripts, where 2 of them were about food & beverage: Georgakopoulos, 2008 and Hwang, Yoon & Bendle, 2012, that had explored the immersion and interactivity related to food, both of them could not recommend the use of technology due to the inability to simulate human emotional responses. It is important to build an emotional connection through experiences in the food context (Ahn, 2021, b).

Augmented reality creates a new communication channel where businesses and their customers that can interact in real time and give the possibility of obtaining location, cost reduction and task optimization or even experiential communication and marketing (Blattgerste, Renner & Pfeiffer, 2018; Tsai, 2020). Augmented reality intervention in enhancing tourism experiences can better meet the psychological needs of visitors (Jiang, Moyle, Yung, Tao & Scott, 2022), or filling the gap by identifying travelers' experiences with AR applications when obtaining travel information (Park & Stangl, 2020).

The tourism industry needs a degree of reconversion as staff and resources must adapt to the creation of AR content to meet the expectations of tourists and weigh the pros and cons to improve the user experience (Manchanda & Deb, 2021).

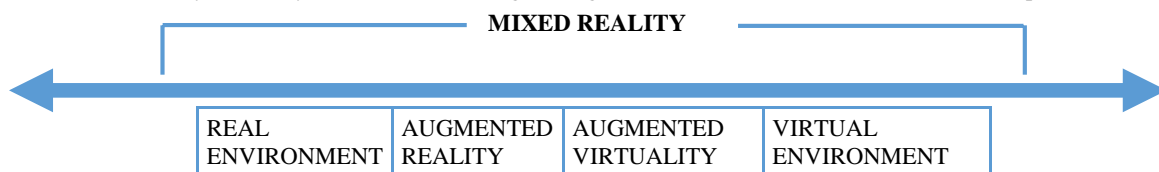
2.3 The new trend of experiential tourists

The new generation of tourists are a profile sensitive to new social trends, hyper-connected to social networks, dependent on mobile applications, consultants in the era of blogging and evaluation platforms by other users, and also followers and promoters of the word of mouth of influencers (Mateos, 2013). Technological innovations have served as a catalyst for the birth of a new generation of tourists (Beltrán, Vicente & Peruzzi, 2021).

Augmented reality (AR) is a type of technology that contemplates two different visions, one is a broad vision that refers to increasing natural feedback for the operator with simulated signals and the other one is a restricted vision that highlights the aspect of technology and defines it as a form of virtual reality (Milgram and Kishino, 1994).

Also AR was that defined as a variation of virtual environments or more popularly called virtual reality (Azuma, 1997). AR is the “intermediate term” between virtual environments and telepresence, a hybrid between the real world and virtual elements (Milgram, Takemura, Utsumi & Kishino, 1995).

Figure 2: Reality-Virtuality Continuum according to Milgram, Takemura, Utsumi and Kishino (1994, p. 283).



There is a clear interest in the possibilities of implementing and developing mobile devices capable of using augmented reality to support the real world (Broll, Lindt, Herbst, Ohlenburg, Braun & Wetzel, 2008).

2.4 Advantages of using augmented reality in gastronomic tourism

Augmented reality opens up a range of possibilities regarding the way of presenting products and adds heat in the process of attracting customers (Loijens, 2017). The assessment that is made of a restaurant is highly conditioned by factors that go beyond the strictly culinary, technology as a tool has a lot to offer. AR in restaurants exceeds

a mere QR code that only facilitates access to the web page.

Through a mobile phone, an interactive menu offers interesting and valuable information. The possibilities of solving doubts, translating the menu, and being able to see in detail each dish on the menu are some of the main attractions of this technology (Özkul & Kumlu, 2019). However, the opportunities seem to be multiplying, now it is also understood as one more gastronomic marketing tool, which joins the actions of social networks to attract new customers. A step further is the ability to create brand through storytelling strategies, virtual games on the surface, listening to the chef describing the menu or the possibilities of collecting data on navigation, use and consumption of the app's guests.

The main advantages of augmented reality in restaurants would be the following: (Bata, 2021).

- The presentation of the dishes is emphasized with a much more attractive and interactive menu.
- An immersive experience is offered.
- More data provided that can determine in greater consumptions.
- Greater comfort for the diner by not having to wait to be served.
- Greater agility in the ordering process, the simplification of the waiters' work allows them a more effective and relaxed performance.
- Less mismatch between customer expectations and reality.
- Less physical contact with the elements and between people can guarantee better hygiene and reduce the number of infections.
- It is a differentiating element from the competition, the modernity of the business and one more attraction.
- It can be complemented with other data collection technologies such as Big Data.

AR also has the ability to alter the vision of things and offers the possibility of changing the appearance of food and beverages in real time (Spence, Okajima, Cheok, Petit, & Michel, 2016).

2.5 The influence of mobile applications

Industries are using new business models using platforms in mobile phones with the purpose of offering attractive and creative services and products (Gretzel, Sigala, Xiang & Koo, 2015).

According to data from the GWI agency and the Statista portal (2021), 4 out of 10 Internet users of working age in the world buy something online every week and, in addition, there are now more people who make purchases through mobile devices than to through computers and the amount of money spent on online consumer goods exceeded \$ 2.4 trillion and in the United States the average buyer spends around \$ 700 annually.

3. Theoretical framework of the intention to use applications with augmented reality

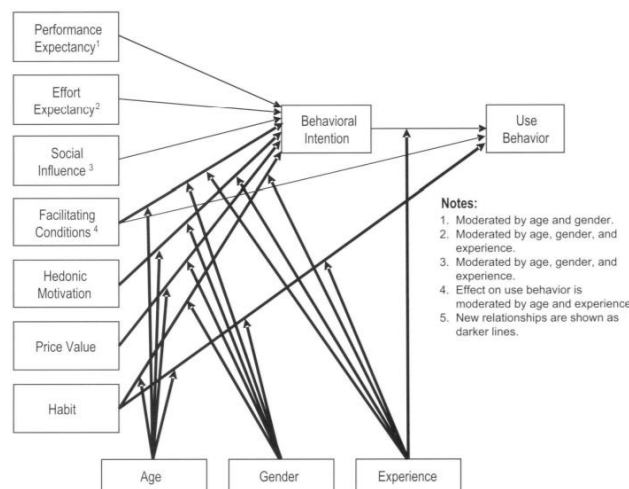
The Theory of Reasoned Action (TRA) of Fishbein & Ajzen (1975) arises whose

purpose was to be able to predict a specific behavior through an expectation value model composed of attitude, subjective norms and the intention to carry out a certain behavior.

This model was reformulated with new theories in the eighties and the Theory of Planned Behavior (TPB) of Ajzen (1991) and the Technological Acceptance Model (TAM) (Davis, Bagozzi, & Warshaw, 1989) emerged. The second version of the Technological Acceptance Model (TAM2) by Venkatesh & Davis (2000) was created excluding the attitude variables.

The UTAUT model (Unified Theory of Acceptance and Use of Technology) was created, with new variables such as expectation, performance and effort, social influence and facilitating conditions. This model considered as the fusion of the previous models that try to explain the adoption of the technology (Venkatesh, Morris, Davis & Davis, 2003). The UTAUT model was revised and new variables such as hedonic motivation, price value and habit were included; validating the UTAUT-2 model (Venkatesh, Thong & Xu, 2012), being the most complete and recognized model for carrying out research on technologies (Bankole, Bankole & Brown, 2017; Park, Gunn, Lee & Shim, 2015).

Figure 3: UTAUT-2. Source: (Venkatesh et al., 2012).



4. Hypothesis

Some authors (Brown & Venkatesh, 2005; Bruner & Kumar, 2005) endorse the relationship between the expectation of utility and the expected effort, and define the expectation of utility as the level at which the use of a technology helps consumers to carry out the activities they seek, the ratio of the expectation of utility to the expected effort which consumers consider that they can execute the activities in the apps is determined.

Other studies show that when consumers perceive technology as easy to use, they also consider the technology to be more useful with a greater expectation of utility (Davis, Bagozzi & Warshaw, 1989; Ha & Stoel, 2009).

There is also relationship between the social influence on the volume of downloads of a certain app and the expectation of utility provided by the app. Social influence is considered as the level at which consumers think that other relevant members in their life believe that they should use technology (Brown & Venkatesh, 2005); (Venkatesh

& Bala, 2008).

It is estimated that the strongest social influences are the cause by which consumers determine a technology as more useful, and this aspect is the reason that influences the intentions of use and that marks the choice to adopt a new product (Venkatesh, Morris, Davis & Davis, 2003; Delre, Jager, Bijmolt & Janssen, 2010).

Social influence has become an almost essential variable for the use of technology, specifically, in mobile applications in developed countries (Malaquias & Hwang, 2019), also customer interactions via mobile applications (e.g. live chat, direct communication with others) leads to increased social engagement (Ahn, 2021); the use of small talk visual kinesic paralinguistic exclamatory feedback and emoticons help the consumer feeling the other being present (De Cicco, Silva & Alparone, 2021).

Habit is considered as the degree to which people tend to carry out behaviors automatically as a result of their learning (Limayem Hirt & Cheung, 2007). This new construct of the model has been used in multiple investigations as a prediction of the intention of use (Kim & Malhotra, 2005; Kim, Malhotra & Narasimhan, 2005; Limayem et al., 2007).

Another variable included in the UTAUT-2 model is hedonic motivation. This is considered a very important variable that significantly influences the final intention of use (Brown and Venkatesh, 2005).

The influence of hedonic motivation on the intention to use a certain technology and the actual use that is made of it is also demonstrated (Van der Heijden, 2004; Karjaluoto, Jayawardhena, Leppäniemi & Pihlström, 2012). Also in the field of food delivery services, the consumer experience in the context of technology acquisition highlight the importance of satisfying hedonic motivations, understanding the consumer experience development process (Gârdan, Epuran, Paștiu, Gârdan, Jiroveanu, Tecău & Prihoancă, 2021). The pursuit of enjoyment, fun and pleasure is closely associated with technology-related consumer behaviour (Choi, 2016), but it's important not to forget that the food quality is a fundamental component for the customers to repurchase and recommend as the first point to be done (Suhartanto, Helmi Ali, Tan, Sjahroeddin & Kusdiby, 2019). Loyal customers should be given more attention since they play a crucial role in promoting sales by attracting and recommending new customers as has been studied in food delivery applications (Al Amin, Arefin, Alam, Ahammad & Hoque, 2021).

The price value variable is determined as the cognitive trade-off that exists between the perceived benefits of using the app and the economic cost of using it by consumers (Dodds, Monroe & Grewal, 1991).

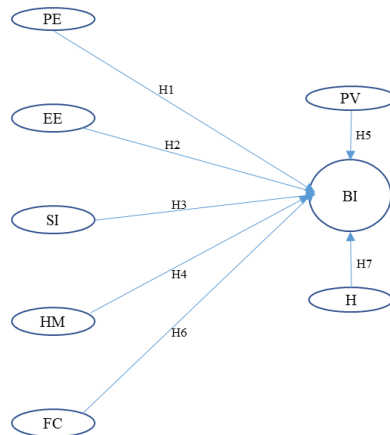
All the variables of the UTAUT-2 model can influence the intention of use that consumers make of the app and, in addition, in the activities related to the purchase or reservation (Chong, 2013; Dodds, Monroe & Grewal, 1991).

The hypotheses proposed are:

- H1: The performance expectation is influenced by the user's intention to use applications with augmented reality.
- H2: The expectation of effort is influenced by the user's intention to use applications with augmented reality.
- H3: Social influence is influenced by the user's intention to use applications with augmented reality.

- H4: Hedonic motivation is influenced by the user's intention to use applications with augmented reality.
- H5: The price value is influencing the user's intention to use applications with augmented reality.
- H6: The facilitating conditions are influencing the user's intention to use applications with augmented reality.
- H7: Habit is influencing the user's intention to use applications with augmented reality.

Figure 4: Proposed Theoretical model



New studies are proposing an integrated framework to study TAM's factors as perceived ease of use and perceived usefulness in the mobile food delivery apps (MFDAs) (Su, Nguyen, Nguyen, Luu & Nguyen-Phuoc, 2022).

The TAM model has been perfected, being the most relevant evolution the TAM 2 by Venkatesh and Davis (2000), and the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003).

In addition to the integration model of technology acceptance and user satisfaction from Wixom and Todd (2005) or the TAM 3 model, proposed by Venkatesh & Bala (2008) in the field of electronic commerce.

The UTAUT-2 model it's considered one of the most current models and used by the literature to measure the acceptance and use of information and communication technologies (ICT) in the context of private consumption (Venkatesh et al., 2012).

Therefore, and based on the aforementioned considerations, the following hypotheses and a conceptual model are proposed, the purpose of which is to predict and assess the intention to use mobile applications with augmented reality.

It is characterized by being a structural model with different variables:

- Performance expectation (Davis, 1989; Venkatesh et al, 2003)
- Effort expectation ((Venkatesh et al, 2003)
- Social influence (Venkatesh et al, 2003)
- Facilitating conditions (Venkatesh et al, 2003)
- Hedonic motivations (Venkatesh et al, 2003)
- Price (Venkatesh et al, 2003)

Habit (Venkatesh et al, 2003)

The variables are simplified as follows:

Table 1: Variables, meanings and questions. (Own Elaboration)

VARIABLE	MEANINGS	QUESTIONS
Performance Expectancy: PE (Davis, 1989) (Venkatesh et al, 2003)	Degree to which a person believes that using the system will help them.	PE1: I think that using an AR app would help me accomplish tasks more quickly. PE2: I think that using an AR app would increase my chances of achieving what is important to me. PE3: I suppose an AR app is useful
Effort Expectancy: EE (Venkatesh et al, 2003)	It is conceptualized as the degree of ease related to the use of a system.	EE1: The use of these apps do not require a big mental endeavor. EE2: The interaction with these apps are clear and understandable. EE3: It is easy to do what I intend to do through these apps. EE4: These apps interface are easy to use.
Social Influence:SI (Venkatesh et al, 2003)	The extent to which consumers perceive that other important people (for example, family and friends) believe that they should use a particular technology.	SI1: People who are important to me think that I should use an AR app in my tourist activities. SI2: People who influence my behaviour think that I should use an AR app in my tourist activities. SI3: People whose opinions I value prefer that I should use an AR app in my tourist activities. SI4: People in my environment who use an AR app have more prestige than those who do not.
Hedonic Motivation: HM (Venkatesh et al, 2003)	The fun or pleasure derived from the use of a technology.	HM1: Using apps in tourist activities will be fun. HM2: Using apps in tourist activities will be enjoyable. HM3: Using apps in tourist activities will be very entertaining.
Price Value: PV (Venkatesh et al, 2003)	The cognitive trade-off between the perceived benefits of using the applications and the cost of using it by consumers is considered.	PV1: Tourism apps are reasonably priced. PV2: Tourism applications with great information are good value for money. PV3: Tourism apps provide great value.
Facilitating Conditions: FC (Venkatesh et al, 2003)	The degree to which an individual believes the necessary resources / knowledge exist to support the use of the system.	FC1: I think that I have the proper smartphone to use an AR app in a shopping mall. FC2: I think that my knowledge of using an AR app in a shopping mall is adequate. FC3: I think that I can use an AR app in a shopping mall with my current smartphone.
Habit: HT (Venkatesh et al, 2003)	The degree to which people tend to engage in automatic learning behaviors.	HT1: The use of SNS to publish content about my tourism experiences has become a habit for me. HT2: I am addicted to using SNS to publish content about my tourism experiences. HT3: The use of SNS to publish content about my tourism experiences is something that I do on a daily basis.
Behavioural Intention: BI (Venkatesh et al, 2003)	The perceived subjective intention / probability that a person will engage in a certain behavior.	BI1: I intend to continue using mobile internet in touristic activities in the future. BI2: I will always try to use the mobile internet in my touristic life. BI3: plan to continue to use mobile internet frequently in touristic activities.

Method and sample

The data was extracted through an online survey (see survey in appendix a). The individuals surveyed had to use or have ever used a mobile application with augmented reality. For immediate recognition, the corresponding icons were displayed and they can be found in the Play Store, Pokemon Go, Google Maps, Google Translators, Star walks, Ink Hunter, etc ...

A non-probabilistic convenience sampling was carried out on users who have used this type of application. The final sample consisted of 151 users, and the results were analyzed using structural equations using Smart PLS3, which is the highly recommended method for exploratory research and offers the possibility of modeling latent constructs (Son & Benbasat, 2007; Hair, Ringle & Sarstedt, 2011).

To elaborate the questionnaire, it has been adapted using a clear and concise questions with familiar and simple expressions (Chang, Van Witteloostuijn & Eden, 2010; Podsakoff, MacKenzie, Lee & Podsakoff, 2003).

The relationships between the variables of the proposed model and the indicators have been analyzed using the statistic (t) with a significance level of 5% (Byrne, 2001).

Results

The values of the measurement models, codes and VIF:

Table 2: VIF (Variance Inflation Factor) values of the measurement model.

VARIABLE	CODE	VIF
Performance Expectancy	PE1	1,414
	PE2	1,665
	PE3	1,467
Effort Expectancy	EE1	1,378
	EE2	1,488
	EE3	1,799
	EE4	1,462
Social Influence	SI1	2,199
	SI2	2,628
	SI3	2,311
	SI4	2,305
Hedonic Motivation	HM1	1,365
	HM2	1,582
	HM3	1,514
Price Value	PV1	1,598
	PV2	2,107
	PV3	1,546
Facilitating Conditions	FC1	-
	FC2	1,071
	FC3	1,071
Habit	HT1	1,704
	HT2	2,334
	HT3	2,443
Behavioural Intention	BI1	1,33
	BI2	1,35
	BI3	1,43

The model lacks a multicollinearity problem because the values obtained in the inflation factors of the VIF variance (variance inflation factor) have been lower than 3.3, which is the level set by authors (Kock, 2015; Yuan Lin, Filieri, Liu & Zheng, 2020), to assess multicollinearity.

The table shows how the inflation factors of the variance are lower than the recommended interval, specifically they are between 1.071 and 2.628.

Cronbach's Alpha establishes a consistency index for the construct and presents values included between 0 and 1, and the lower limit to accept the reliability of the construct is set at 0.6 (Hair, Anderson, Tatham & Black, 1999).

The AVE (Average Variance Extracted) is defined as the variance obtained from the mean and reports on how much variance is obtained from a construct (Fornell & Larcker, 1981; Götz, Liehr-Gobbers & Krafft, 2010).

Table 3: Indexes and Limits (Fornell and Larcker ,1981)

Indexes	Limits
<i>Cronbach's alpha</i>	0.7 as the lower limit.
<i>CR (Composite Reliability)</i>	0,6 as the lower limit
<i>AVE (Average Variance Extracted):</i>	0,5 as the lower limit.

The results show that the CR values are greater than 0.6 and that the AVE values are greater than 0.5. However, in the case of Cronbach's Alpha index, not all variables reached or exceeded the limit of 0.7. So, it can be affirmed that the reliability and convergent validity have been accepted with high credibility in each construct of the model.

The exception is the value 0.409 of the Cronbach index in the variable facilitating conditions, however, the AVE and CR values are within the accepted parameters.

Table 4: Reliability and convergent validity of the proposed constructs.

VARIABLE	CRONBACH ALPHA	AVE (Average Variance Extracted)	CR (Composite Reliability)
PE(Performance Expectancy)	0,743	0,651	0,848
EE (Effort Expectancy)	0,762	0,581	0,846
SI (Social Influence)	0,85	0,688	0,898
HM (Hedonic Motivation)	0,738	0,653	0,848
PV (Price Value)	0,771	0,688	0,868
FC (Facilitating Conditions)	0,409	0,589	0,721

HT (Habit)	0,844	0,763	0,906
BI (Behavioural Intention)	0,7	0,623	0,832

Discriminant validity fixes the extent to which one construct is different from others, and a high value implies weak correlations between constructs. To measure the discriminant validity, the criteria of Fornell and Larcker, (1981), the cross loads and the Heterotrait-Monotrait ratio (HTMT) were used.

Table 5: Discriminant validity under the Fornell and Larcker criteria

VARIABLE	PE	EE	SI	HM	PV	FC	H	BI
Performance Expectancy	0,81							
Effort Expectancy	0,52	0,76						
Social Influence	0,44	0,37	0,83					
Hedonic Motivation	0,48	0,66	0,41	0,81				
Price Value	0,32	0,42	0,6	0,53	0,83			
Facilitating Conditions	0,38	0,38	0,31	0,3	0,27	0,77		
Habit	0,43	0,3	0,64	0,28	0,36	0,38	0,87	
Behavioural Intention	0,58	0,44	0,6	0,5	0,41	0,48	0,68	0,8

From the point of view of cross loads, no indicator shares more load with another, unless it is the construct itself. On the other hand, as can be seen in table 4, it has been found that the square root of (AVE) is greater than the relationship between the construct and the rest of the constructs of the model (Fornell & Larcker, 1981).

Therefore, it is true that the construct shares more variance with its indicators than with other constructs in a specific model (Henseler, Ringle & Sinkovics, 2009).

Therefore, through the analysis of the cross charges, the discriminant validity is again accepted.

Table 6: Discriminant validity under the criterion of cross loads.

VARIABLE	CODE	PE	EE	SI	HM	PV	FC	HT	BI
Performance Expectancy	PE1	0,866	0,378	0,464	0,404	0,301	0,338	0,531	0,598
	PE2	0,823	0,445	0,332	0,393	0,256	0,27	0,263	0,413
	PE3	0,726	0,503	0,196	0,371	0,213	0,318	0,113	0,32
Effort Expectancy	EE1	0,277	0,699	0,277	0,397	0,248	0,25	0,233	0,264
	EE2	0,397	0,701	0,212	0,561	0,37	0,281	0,094	0,24
	EE3	0,485	0,867	0,319	0,602	0,34	0,265	0,251	0,442

	EE4	0,277	0,699	0,277	0,397	0,248	0,25	0,233	0,264
Social Influence	SI1	0,457	0,452	0,822	0,394	0,434	0,333	0,589	0,53
	SI2	0,429	0,431	0,885	0,406	0,537	0,329	0,59	0,576
	SI3	0,221	0,159	0,797	0,287	0,524	0,158	0,419	0,425
	SI4	0,308	0,118	0,81	0,258	0,513	0,171	0,495	0,449
Hedonic Motivation	HM1	0,299	0,463	0,287	0,71	0,397	0,232	0,09	0,275
	HM2	0,415	0,492	0,38	0,87	0,452	0,221	0,296	0,474
	HM3	0,431	0,658	0,325	0,83	0,442	0,284	0,248	0,419
Price Value	PV1	0,245	0,276	0,462	0,344	0,79	0,149	0,32	0,323
	PV2	0,231	0,342	0,545	0,41	0,89	0,312	0,324	0,349
	PV3	0,329	0,409	0,488	0,561	0,8	0,21	0,241	0,349
Facilitating Conditions	FC2	0,179	0,358	0,105	0,225	0,259	0,491	0,041	0,142
	FC3	0,371	0,32	0,313	0,269	0,227	0,968	0,413	0,495
Habit	HT1	0,409	0,267	0,478	0,217	0,192	0,401	0,84	0,602
	HT2	0,33	0,283	0,636	0,312	0,416	0,278	0,88	0,586
	HT3	0,372	0,241	0,561	0,209	0,324	0,323	0,9	0,603
Behavioural Intention	BI1	0,449	0,352	0,359	0,373	0,361	0,367	0,409	0,739
	BI2	0,477	0,362	0,539	0,438	0,322	0,399	0,668	0,824
	BI3	0,444	0,335	0,511	0,359	0,3	0,378	0,507	0,802

The individual reliability of the loads (λ) of the indicator is measured. The usual thing was to establish the minimum level for its acceptance as part of the construct at $\lambda > = 0.707$ (Carmines & Zeller, 1979).

However, other authors differ from this rule, considering it excessively rigid in the initial stages and, in general, in little-studied subjects, and minimum values greater than 0.5 or 0.6 are also accepted in these cases (Barclay, Higgins & Thompson, 1995; Chin, 1998).

Table 7: Discriminant validity under the Heterotrait-Monotrait (HTMT) criterion.

VARIABLE	PE	EE	SI	HM	PV	FC	HT	BI
Performance Expectancy								
Effort Expectancy	0,71							
Social Influence	0,5	0,43						
Hedonic Motivation	0,64	0,88	0,51					
Price Value	0,42	0,55	0,75	0,7				
Facilitating Conditions	0,67	0,77	0,43	0,58	0,54			
Habit	0,47	0,36	0,75	0,33	0,44	0,49		
Behavioural Intention	0,76	0,58	0,76	0,67	0,56	0,81	0,87	

Model evaluation

The R^2 value is the reference data estimated by some authors such as Hair, Ringle & Sarstedt, (2014), to evaluate the effect size (f^2), in addition to the standardized residual mean square root (SRMR) and the p-values.

The values of the explained variance R^2 are considered as the criterion to measure the model (Chin, 1998). Consequently, the results obtained from the evaluation of R^2 and adjusted R^2 will be sufficient to assess the quality and potency of the construct. The reference criterion to determine it is established that said R^2 values are greater than 0.1 (Falk & Miller, 1992).

Table 8: R^2 values for latent variables (Falk & Miller, 1992)

	R^2	R^2 ajustaded
Behavioural Intention	0,6	0,622

The values shown in the table 8 are higher than 0.1, so it is estimated that the construct is of quality and powerful.

Next, the following table shows what impact the independent variables have on the dependent variables through effect size (f^2).

The criterion to take into account in the degree of quality was the following (Henseler et al., 2009):

- Weak (> 0.02)
- Average (> 0.15)
- Strong (> 0.35)

It is determined that all the relationships are within the acceptance interval, except for the variable "effort expectation" and the variable "price value".

Table 9: f^2 values for latent variables

VARIABLE	Behavioural Intention
Performance Expectancy	0,0071
Effort Expectancy	0,001
Social Influence	0,027
Hedonic Motivation	0,059
Price Value	0,002
Facilitating Conditions	0,055
Habit	0,236
Behavioural Intention	0,071

Discussion of results

By addition, and with the purpose of validating the hypotheses raised about the structural relationships between the variables, bootstrapping on sampling has been used, the recommendation was to start it with a number of 5,000 subsamples (Hair, Sarstedt & Ringle, 2019) in order to assess the results.

Table 10: Hypothesis testing through Bootstrapping analysis

HYPOTHESES	(STDEV)	T Value	P Value	Resultss
1 Performance Expectancy -> 8 Behavioural Intention	0,076	2,709	0,007	Supported
2 Effort Expectancy -> 8 Behavioural Intention	0,08	0,399	0,69	Rejected
3 Social Influence -> 8 Behavioural Intention	0,085	1,801	0,072	Rejected
4 Hedonic Motivation -> 8 Behavioural Intention	0,097	2,193	0,028	Supported
5 Price Value -> 8 Behavioural Intention	0,079	0,422	0,673	Rejected
6 Facilitating Conditions -> 8 Behavioural Intention	0,075	2,173	0,03	Supported
7 Habit -> 8 Behavioural Intention	0,077	5,15	0	Supported

Most of the relationships between the variables are accepted since they fall within the acceptance threshold. Acceptance criteria: Value (p) less than 0.05 Rejection criteria: Value (p) greater than 0.05.

The rejected relationships are "Effort Expectation> Intention of Use Behavior", "Social Influence> Intention of Use Behavior" and "Price Value> Intention of Use Behavior".

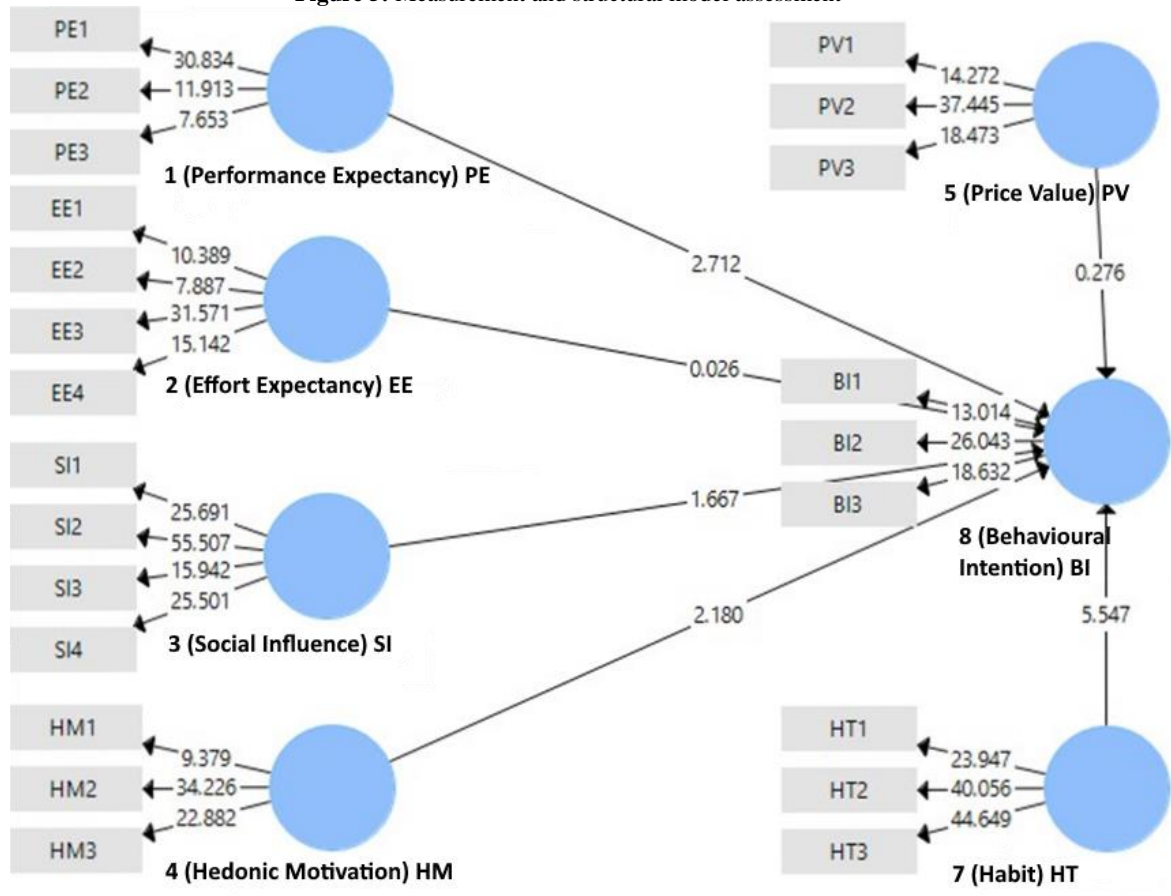
Finally, in order to be able to quantify an adequate fit of the model, the square root of the standardized residual mean (SRMR) has been taken into account, as collected by Henseler et al. (2009). A model has a good fit when the SRMR is less than 0.10 (Williams, Vandenberg and Edwards, 2009).

However, it should also be noted that some authors are not in favor of using SRMR in PLS as they do not consider it representative, and many questions remain to be answered regarding model fit metrics (Hair, Sarstedt & Ringle, 2019).

Tabla 11: GFI: Goodness of Fit Index

	GFI
SRMR	0,091
d_ ULS	2,701
d_ G	0,919
Chi Square	819,27
NFI	0,617

Figure 5: Measurement and structural model assessment



Conclusions.

The main conclusions are that performance expectation, effort expectation, social influence, hedonic motivation, price value, facilitating conditions, habit and behavioral intention, serve as predictors in the intention of use of mobile applications with augmented reality. The unsupported hypotheses that could not be considered predictors were: effort expectation, social influence, and price value. Predictors that have a more social nature, such as aspects associated with perceived enjoyment, habits and social influence are more unstable for the model. The refers to the value of the price has a been a difficult variable because majority of the augmented reality apps are free. However, it is a variable that exerts a positive influence on the intention to use these applications, because the variable is valued by the cognitive compensation that exists among the perceived benefits of using these applications and the cost involved in learning or downloading.

Another conclusion drawn from the results is that the demographic profiles of consumers can become important predictors when adopting the use of a certain technology on mobile devices. Younger consumers (millennial and Z generations) are more likely to use mobile devices with augmented reality.

Finally, it is interesting that this study is taken into account as a starting line to help researchers, developers and professionals who work in a technological marketing context, to draw up strategic lines of design and attracting consumers of this type of mobile applications.

As mentioned at the beginning of this research work, the great engine of change inexorably passes through technology and, therefore, it has been decided to undertake this research. The aim was to establish the justification for the use of a certain technology as a tool and catalyst for changes in convulsive contexts such as the current one. The instability of the tourist markets caused, mainly, by COVID-19 has also been a cultivable terrain to take advantage of the flourishing of new ideas originated, mainly, in the new social trends of the generations that use mobile applications the most.

Considerations

Despite the fact that Spain is one of the countries with the highest number of mobile devices per inhabitant, with ten percentage points above the European Union average, the market for mobile applications is very unstable and with asymmetric growth. Consequently, it seems necessary to invest only in developing those mobile applications that can provide a competitive advantage for businesses and added value for consumers. Therefore, it is interesting to have analyzed the intention to use mobile applications with augmented reality, to assess which of the variables most influence their use by consumers and, in this way, allocate resources (which are always finite) to those applications that suppose an incremental jump.

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