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Trabajo Fin de Grado

El impacto de los filtros de realidad aumentada en la percepción de las marcas en redes sociales

The impact of augmented reality filters on brands' perceptions on social media

Autor

Ana López Santander

Director/es

Sergio Ibáñez-Sánchez

Carlos Orús

Facultad de Economía y Empresa

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Author: Ana López Santander

Supervisors: Sergio Ibáñez Sánchez

Carlos Orús

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ABSTRACT

New technologies, such as augmented reality, are being increasingly used by companies in order to interact with customers. Currently, brands are using this technology on social networking sites to generate more valuable experiences. Considering this, the following undergraduate dissertation analyzes the impact of the use of branded augmented reality face filters on users' perceptions and behavioral intentions on social networking sites. Particularly, it is analyzed how the experience with these augmented reality filters generate higher perceptions of enjoyment and interactivity, higher brand awareness and brand image, as well as more positive behavioral intentions. Results from this research help managers better identify the underlying factors by which brand actions with these augmented reality filters can be effective to improve users' experiences.

RESUMEN

Las nuevas tecnologías, tales como la realidad aumentada, se usan cada vez más por las empresas para interactuar con los consumidores. Actualmente, las marcas están usando esta tecnología en las redes sociales para generar experiencias más valiosas. Considerando esto, el siguiente trabajo de fin de grado analiza el impacto del uso de filtros faciales de realidad aumentada por parte de marcas en las percepciones y las intenciones de comportamiento de los usuarios en redes sociales. En particular, se analiza como la experiencia con estos filtros de realidad aumentada generan mayores percepciones de diversión e interactividad, mayores reconocimiento e imagen de marca, así como intenciones de comportamiento más positivas. Los resultados de esta investigación ayudan a los empresarios a identificar de una mejor manera los factores por los cuales las acciones de marcas en relación con los filtros de realidad aumentada pueden ser efectivas para mejorar las experiencias de los usuarios.

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1. Introduction

Augmented Reality (AR) has turned from a difficult and costly technology into a breakthrough one in just over a century. It has developed quickly and there are currently many applications in use or under development (Interaction Design Foundation, 2019). AR is not only a cutting-edge technology but it also has a big potential in many fields as it has disrupted numerous industries by now (Bullock, 2018), such as medicine, marketing, tourism or education (Flavián, Ibáñez-Sánchez and Orús, 2018). AR is a technology that projects (superimposes) computer-generated images on the real world so that experiences are enhanced (Bullock, 2018). By 2017, the AR industry was valued at over $600 billion (Centric Digital, 2017). Particularly, AR ads are expected to generate over $13 billion in revenue and comprise over a 12% of the mobile ad revenue by 2022 (Hollander, 2019). Therefore, these data justify the study of AR in the marketing field due to its potential relevance.

Recently, AR has been integrated into social networking sites. It has proven to work very well with social media as Snapchat, Instagram or Facebook where users are allowed to use the AR features by creating their own experiences through camera lenses and face filters effects. Although it is still on its early stages, brands have started to embrace this technology progressively on social media as they have found a powerful marketing tool on it.

Figure 1.1. Face filters on social media (Sapio, 2018

Through the creation of branded face filters on social media, consumers can try out products, such as new makeups, glasses or hairstyles, using their cameras on the different networks (Bullock, 2018).

In addition, they could enjoy or relax themselves by trying these filters on social media. Consequently, it has proven to be an effective way to engage consumers, expand their reach and build brand awareness (Hollander, 2019). Customers' experiences with these social media filters are the basis of the adoption of AR. Therefore, brands should carefully plan their AR face filters experiences according to their strategies. Customers' preferences are changing and this technology can help marketers to reach their public in a better way (Centric Digital, 2017). This new technique applied to marketing and advertising does not only attract the audience's attention but it also delivers personalized, valuable and highly creative content (Pérez, 2017). In addition, previous reports have noted that creating AR experiences for the audience has a positive effect on consumers' engagement (Blippar, 2018) and interactivity (Monllos, 2017), brands' awareness (Dans, 2018) and brands' image (Animalz, 2017). In addition, when users from the audience enjoy their use, they share the results, what leads to a word-of-mouth marketing of the brands (Hollander, 2019). Taking the previous information into consideration, the main aim of this project is to shed light on the impact of AR technologies in social media, specifically of AR face filters, on the perceptions and behavioral intentions toward brands. More concretely, the objective is to analyze the influence of the use of these brand-based AR filters on variables such as enjoyment, interactivity, brands' awareness, brands' image and behavioral intentions.

In order to achieve this, previous research about what AR is, how it has evolved throughout the years, its different applications and how it can be related to consumer engagement was reviewed. After that, it is explained how brands can use AR technologies to interact with their consumers. Finally, the use of AR technologies on social media, particularly of AR face filters, and how brands are using this technology in order to engage their users is explained. Consecutively, a description of the most relevant variables that are aimed to be analyzed in the project can be found. After that, we explain the methodology and the results of the analysis. Some conclusions related to the main results and implications for brands can be found in the final section.

2. Literature review

2.1. The Reality-Virtuality Continuum and definition of AR

Milgram and Kishino's (1994) taxonomy is considered the starting point to distinguish and classify the different realities. Milgram and Kishino (1994) defined the concepts of reality and virtuality. Real objects are the ones that actually and objectively exist and virtual ones exist in essence but not actually. A real object can be directly viewed, however, a virtual one needs to be simulated as it genuinely does not exist.

Once these terms are clear, there is a big variety of environments ranging from reality to virtuality, creating a continuum (see Figure 2.1). At the left of the continuum, the real environment is placed, consisting of mere real objects that show real scenes. On the contrary, on the right side, the virtual environment is placed. This one is composed of computer-generated or virtual objects that do not exist in real life and are shown with a device. Therefore, a mixed reality environment is the one where the virtual objects are displayed together with the real-world ones and can be placed anywhere within the continuum. Some different realities can be found in the mixed reality area. Among them, the most well-known are augmented reality (AR) and augmented virtuality (AV). AR refers to any real environment that is augmented by virtual objects that are overlapped on them (Milgram and Kishino, 1994), while AV refers to the opposite idea: virtual environments in which real objects are overlaid.
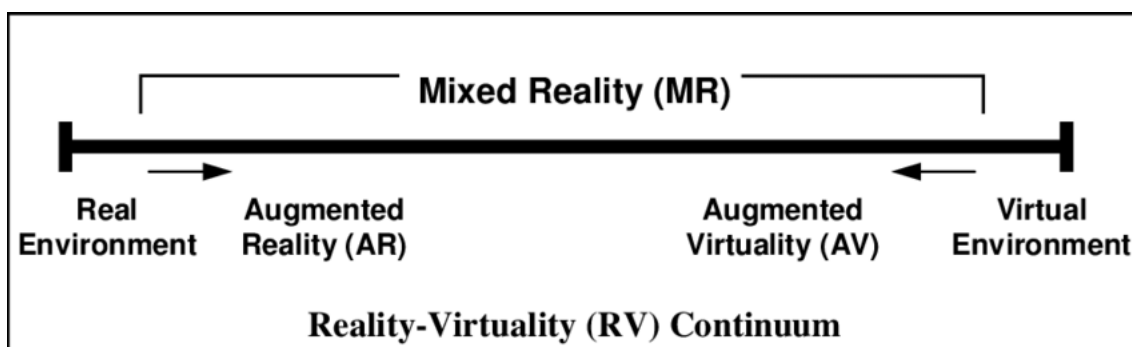
Figure 2.1. The virtuality-reality continuum (Milgram and Kishino, 1994)

Even though mixed reality has always been treated as any type of reality that merged real and virtual elements, being augmented reality and augmented virtuality part of it, recent advances have made it necessary to distinguish mixed reality as others have cleared boundaries and have defined mixed reality as an independent environment in the middle of the continuum. With that aim in mind, Flavián, Ibáñez-Sánchez and Orús (2018) defined a new term called Pure Mixed Reality. This one presents virtual elements in a way that they cannot be distinguished from the physical environment. Users can interact with both virtual and real objects in real time and objects interact with each other. Real objects can modify the virtual elements unlike the AR. Examples of new "pure mixed reality" HMDs are Microsoft Hololens and Magic Leap. The reality-virtuality continuum would change to this one (see Figure 2.2).
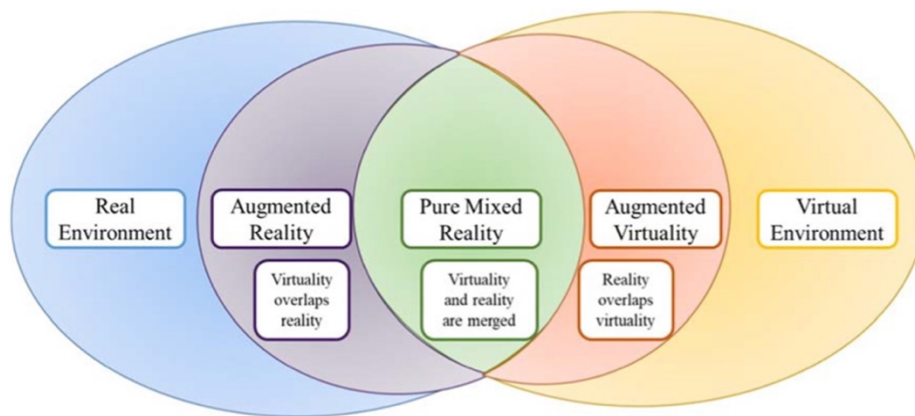
Figure 2.2. The reality-virtuality continuum proposed by Flavián, Ibáñez and Orús (2018)

Many authors have tried to define what AR is. Carmigniani (2011) defined AR as "*a real-time direct or indirect view of a physical real-world environment that has been enhanced/augmented by adding virtual computer-generated information to it*" (page 2).

Azuma (2001) stated that "*an AR system supplements the real world with virtual (computer-generated) objects that appear to coexist in the same space as the real world*" (Javornik, 2016, page 2).

In order to better understand how an AR experience works, the main elements involved should be cleared out. The main ones are the users, i.e. the participants in the experience that have access to the virtual content. The second element that shall be defined is the targets, meaning by that, the objects of the real environments that will be augmented with virtual information. Another important part of the experience that can be taken for granted but can influence it, is the passive AR elements. These are not a direct part of the experience but can impact them and are composed by the bystanders, who observe the user's actions directly or the content the user generated (Mead, 1934); and the background, that contains objects that are located in the same environment as the targets but that are not augmented.

AR has gained special relevance since the 21st century began, yet this term can actually be traced back to many years ago (Innovae, 2018) and has been used for longer than what people think (Isberto, 2018). Therefore, in the following section the different uses that have been given to AR and how it has evolved through the years until now will be disclosed.

2.2. History of Augmented Reality

Augmented reality (AR) has started to play an important role in the marketing environment. It was in 1950 when AR started getting developed in different forms. The Ivan Sutherland in 1968, developed the first device of AR in Harvard that was called 'The Sword of Damocles'. It was a head-mounted display that allowed viewing 3-D graphics. The next major breakthrough was carried out by Myron Krueger in 1974. It combined a projection system and video cameras that showed shadows and made the user feel in an interactive place. During the 70s and 80s researchers, NASA and other industries developed wearable devices and 3-D graphics. However, it was not until 1990 when the term "Augmented Reality" was coined by the scientists Caudell and Mizell in the field of aviation. According to Azuma (2001) and Carmigniani (2011) 'An AR assistance system for workers who were wiring harnesses' (Javornik, 2016, page 2). Since then, and after portable computers and mobile phones were created, AR started gaining importance and attention, especially in computer science and mobile technology (Azuma et al., 2001; Van Krevelen and Poelman, 2010; Preece et al., 2015).
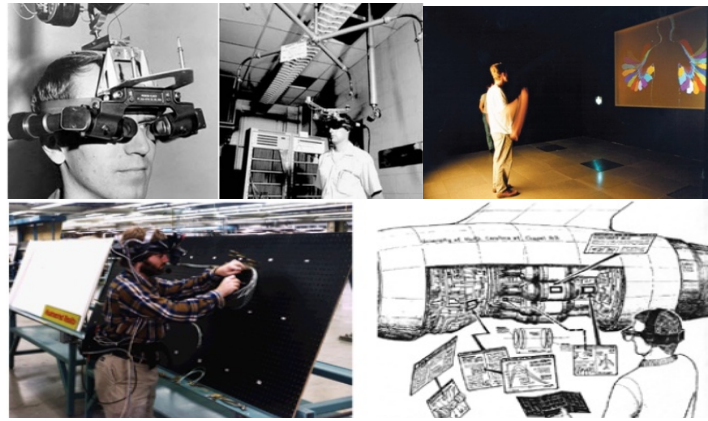
Figure 2.3. The Sword of Damocles, Myron Krueger's computer graphics and Caudell and Mizel's wire harness.

According to Davis (1989) and Pavlou (2003), originally, this technology was not strong as it was costly and it had not been developed enough to be spread out to the general public. In addition, it was not easy to use and was not intuitive. Nevertheless, as time passed by, the situation has changed: several advances have been made, the costs have decreased and the widespread use of portable and mobile technologies has made it easy the adoption of AR. It has been integrated in the digital environment and linked to geolocation applications which led to an increase in its relevance. Nowadays, it can be found in a wide variety of industries: medicine, gaming, military, art, navigation, education, tourism and architecture.

Moreover, AR is becoming one of the biggest trends, the technological companies are increasingly investing on it and as time passes more brands are finding the opportunities this technology offers when creating marketing experiences that are quite interactive. With the advancements of smartphones and mobile applications, AR keeps moving forward and evolving (Lorena, 2017). Some examples of big companies that have tried this are for instance Google, which created intelligent AR glasses (Gglassday, 2019) or the American company Niantic, that developed an AR application called Pokemon Go which got 500 million downloads worldwide (Guadamuz, 2017). AR is expected to be the most relevant future trend (Berger, 2014).

2.3. Classification of AR technologies

To deepen into the knowledge of AR, we should distinguish between the different types of AR that currently exist (Profiletree, 2018). First of all, marker-based AR technologies use barcodes, QR codes or any visual marker that needs to be scanned or read by a device's camera that will display the virtual information after that (Singh, 2018). Some examples of this are the mobile AUTOBILD app which allowed to scan an icon and provided new content like videos, audiobooks… and the mobile IKEA catalogue app which also allowed access to virtual content.

Figure 2.4. Screens from IKEA's mobile catalogue app (Baldwin, 2012), AUTO BILD's mobile app (Google play, 2015).

The second type is the markerless AR, which is one of the most implemented types. In this case, the AR scene trigger elements are real images or objects. Its main feature is that no markers are needed, it's the actual real physical environment which acts as such. The devices capture an image, analyze its geometry and color so that it can be recognized later. Sometimes the GPS feature is used to locate and interact with the AR resources (Yariv Levski, 2019). In this category, some examples are the mirror apps of Mister Spex and Ray Ban that used try-on technology for eyewear. They allowed the trial of glasses on a device's webcam placing them on the face of the person using them.
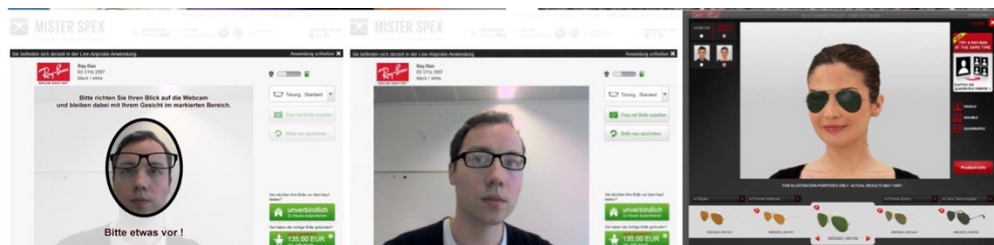
Figure 2.5. Mister Spex (Pohlmann, 2013) and Ray Ban (Radley, 2014).

Thirdly, location-based AR links AR to specific locations. It uses GPS, digital compasses, velocity meters and accelerometers to detect position, orientation and shows the relevant information on the user's smartphone. It can also map directions and search nearby places. The best example of this kind is the application Pokemon Go which detected the position of the user and when he or she was getting close to the Pokemons (Liliia H., 2018).

Figure 2.6. Pokemon Go (Russell Holly, 2017)

Besides these main types, some others also define projection-based AR as a technology that projects light on surfaces by interacting with the hand. A good example of this kind is the Haunted Mansion attraction in Disney in which a ghost is projected onto a blank-faced bust and gives the feeling that it is a statue (Gomindsight, 2017).

Finally, the superimposition-based AR works by replacing the entire or partial view of an object on a device with AR (Gupta, 2019). For example, doctors are able to use this technology to superimpose the X-Ray view of a patient's body part on the real image to show in a better way the damaged bones (Technosparkx, 2018). Another example is the Ikea catalogue app already mentioned which besides being a marker-based

Figure 2.7. Haunted Mansion AR (IEE Computer society, 2012), X-Ray AR (Digitin, 2019) and IKEA Place app (Placetree, 2018).

one it also places objects on the screen so that customers could see how their products fit in their room.

Furthermore, some further classification can be made according to the devices on which AR can be used and experienced. First of all, the head up displays were created for mission applications such as for flight controllers. This technology allows information to be projected on transparent screens in front of the pilot. It usually contains a projector, a viewing glass and a computer. One example of this kind is helmet mounted displays. Continuing with holographic displays, in this case it is not required to wear any device as the information is displayed on real space. Smart glasses, as its name says, basically augment the vision by locating the glasses on the users' face. For instance, as it was already commented above Google Glass were a version of this technology as they showed information for the users without using their hands (Gglassday, 2019).

Finally, the handheld AR or mobile AR only requires a smartphone to have access to the AR experience (Kore, 2018). Some examples are found on Apple's creation of ARKit and Android ARCore, which basically represent new smartphone features that improve the hardware and software that comprise them and allow to experiment AR in a novel way (Neosentec, 2017). They interpret images that the camera captures and how the light is reflected on the different elements that sees to obtain a 3D map of the surroundings and calculate distances between different objects from the own camera and device's position (Fernández, 2018).

2.4. Customer experiences and AR

Since customer experiences are the outcome of the interaction between the firms and the customers, firms have an interest in making these experiences positive so that the outcome is positive as well (Brakus, 2009). Therefore, it is important how these moments of interaction between customers and companies are managed. According to Forrester (2016), 72% of businesses have improving customer's experience as a top priority, and as stated by Forbes (2017) "*providing emotionally engaging customer experiences during the purchase journey is acknowledged as a marketing trend for 2018*" (Flavián, Ibáñez-Sánchez and Orús, 2018, page 8). In addition, technologies have an important role and can affect in a good way the customer experiences and marketers should know how to use them in order to achieve this.

Scholz & Smith (2016) propose four steps that could be followed when designing an AR experience.

Table 2.1. Four steps proposed by Scholz and Smith.

1	**Define the target audience and communications objectives**
2	**Determine how the AR layer will be activated**
3	**Regulate who and how the AR content will be manipulated**
4	**Decide how the AR content will integrate with the passive elements**

Firstly, companies should **define the target audience and communications objectives to establish the strategy and the goals of the determined AR experience**. By determining the different factor's levels, companies can design the type of experience they want to offer with the best technology according to the objectives they want to achieve.

Secondly, how the AR layer (virtual information) will be activated or "triggered" shall also be determined. Letting the user have the ability of deciding when, where and how to activate the layer will make them feel more positive about it (Collier and Sherrell, 2010). However, it can also be decided that the marketers will trigger the AR layer, giving them control over who participates. This will depend on the communications objectives decided in step one.

The **third** step is to r**egulate who and how the AR content can be manipulated**, i.e. the level of interactivity. This refers to the level of the user's ability to modify the virtual environment and the feedback received upon the actions they take (Carrozzino & Bergamasco, 2010; Muhanna, 2015). There are other points of view with regards to how interactivity is perceived (Kiousis, 2002). According to Downes and McMillan (2000) interactivity can be defined by the outcome of the properties of the technology. Being these, speed, mapping and range. For instance, if an application on a mobile phone provides a lagged response the user will feel a low level of interactivity (JIM Yim, Chu & Sauer, 2017). In this case internal devices offer direct interactivity and can better track the behavior of the user. They can modify the position, features and orientation of objects

(Slater, 2009). On the contrary, external devices offer indirect interactivity (Bowman and Hodges, 1999). This can be done by a small group of people or users who are able to contribute and modify the virtual content.

Finally, the **fourth** step is **to decide how the AR content will integrate with the passive elements previously commented, that is, the bystanders and the background**. The main decision concerns how much the content of the context will be integrated and it will depend on the kind of experience the company wants to offer. The more a layer is integrated to the context, the more the planning, investments and technical capability are required. Furthermore, when the content is presented in a public place, the contribution of the bystanders can take an important role as they can disrupt and ruin the experience so these risks should be taken into account and try to be eliminated. All these considerations shall be addressed in order to maximize the consumer engagement.

After having determined the steps to be followed when creating an AR experience some examples of how companies have been using AR will be commented. In April 2018, Zara performed a two-week promotion in which customers by using their phones could trigger a virtual catwalk on the window displays substituting the usual mannequins with this AR experience (Cicklum, 2018). Another example is an experience offered by Coca-Cola with which they wanted to solve a problem in its B2B sales department. The experience allowed visualizing how beverage coolers could look on retail stores by simulating soft drink coolers of different sizes and designs throughout a smartphone device (Cicklum, 2018). Finally, the last example comes from L'Oreal, which partnered up with Perfect Corp to create a makeup app called YouCam. This application allowed users to try makeup at their homes, without the need of going to an actual store (Lorena, 2017).

2.5. Consumer engagement and brand awareness in AR experiences

In the previous section the steps that should be followed in order to maximize the consumer engagement were addressed. Consumer engagement that is defined as "the process of involving consumers in specific interactions and/or interactive experiences in order to build and enhance consumer relationships" (Brodie, Ilic, Julic and Hollebeek, 2013). A technology that can be used to improve customers' engagement is AR, as this generates novel experiences that lets users interact in a non-traditional way with brands.

As mentioned before, creating technology-enhanced experiences adds value, improving consumers' engagement. It can also help when creating brand awareness, which is a component of brand knowledge (Keller, 1993). If a consumer acquires knowledge about a brand, in a passive or active way, it will lead to a higher brand awareness about their products or services (Valkenburg & Buijzen, 2005).

Brand awareness can be split into two dimensions: brand recognition (the ability of the customer to distinguish a brand when they hear the brand name), and brand recall (which is given when users link brands to some product category). Furthermore, brand recall requires more involvement than brand recognition as it requires more effort. Aaker (1991) describes brand awareness as '*the buyer's ability to recognize or recall that a specific brand is a member of a certain product category*' (page 39).

It is believed that the more familiar users are with brands, more brand awareness exists and, as a consequence, they have more confidence and trust on it (Laroche, Kim & Zhou, 1996; Smith & Wheeler, 2002). Brand awareness affects the decision-making processes of consumers as they prefer to buy well-known brands that they find trustworthy rather than from an unknown one. In addition, previous research has found that brands that are reputable generate more positive customers' attitudes towards their advertisements (Macdonald & Sharp, 2000).

AR provides three types of consumer engagement (Scholz and Smith, 2016): user-brand engagement, user-user engagement and user-bystander engagement. In the context of this study, we focus on the user-brand engagement dimension (Scholz and Smith, 2016). It refers to "the types of actions/perception, manipulation and interaction available to users of an AR layer" (page 7). A higher level of user-brand engagement is achieved by giving users the ability to interact with the AR content and therefore having a high level of affordance. The users become targets and are affected by the content as well as affecting the content displayed.

The main conclusion of Scholz and Smith's ideas is that if marketers want to enhance customers' experiences that create value for them through the use of AR technologies, they should focus on modelling the experience so that it will meet the customer expectations rather than in the technological part of the experience. Furthermore, they should target the right audience and foster engagement specially between the user and the brand. They should also coordinate the AR initiatives with the

company's strategy and goals, trying to avoid the threads that may arise from it and encouraging consumers to try and come back to live again the experience.

Some recent data from Retail Perceptions has proven that 61% of shoppers prefer stores which offer AR experiences over the ones that do not offer them. After having experienced AR with a product, 71% would return more often and 40% would be willing to pay more for the product (Vertexvr, 2018). Furthermore, according to Blippar (2018), brands that have started working with AR to promote themselves have seen its impact with a 30% bigger engagement rate. The kind of AR that is becoming more popular is the "self-augmentation" achieved by virtual mirrors or digital try-ons more commonly used by apparel and cosmetic brands. It can be concluded therefore that whatever the application of AR is, it helps firms to draw customers attention and offer different experiences that lead to the public remembering the brand and generating bigger engagement (Neoattack, 2018).

2.6. AR and social media

According to a report made by Digital in 2019, elaborated by We Are Social together with Hootsuite, there are 3,484 million active users of the social media, that is a 45% of the worldwide population. Between these, 3,256 access the social media throughout their mobile devices, a big increase comparing it to the results of the previous year. More specifically, in Spain, 60% of the population uses social media.
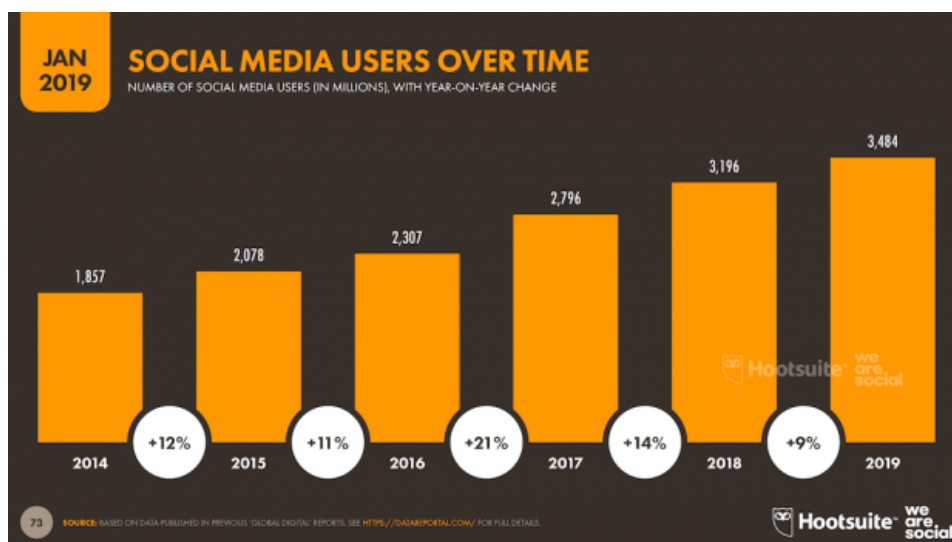
Figure 2.8. Social media users over time

This research shows how Facebook is the current leader in the social networks with the biggest number of users. Followed by WhatsApp which has grown a 15% and Instagram that has increased its number of users from 800 million to 1,000 million.

However, it can be seen in figure 2.9 how Snapchat or Twitter are not part of the most used networks as they are losing users little by little.
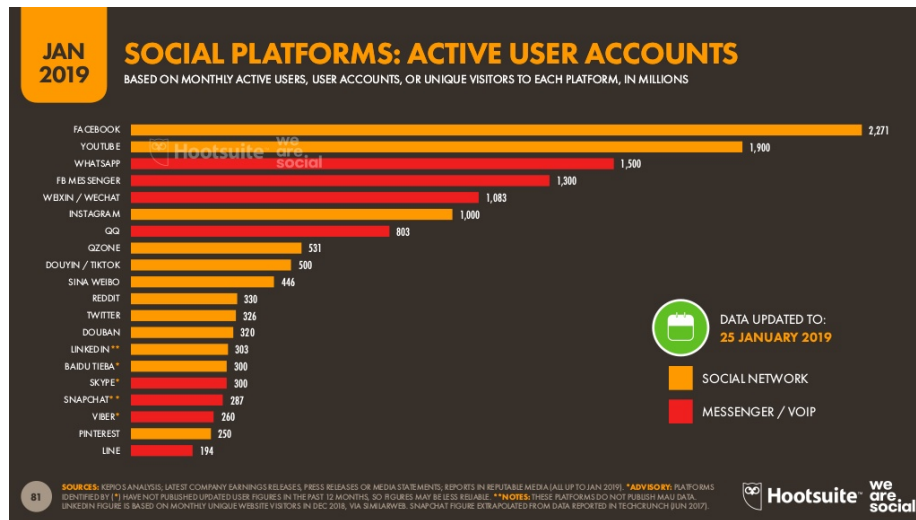
Figure 2.9. Active user accounts on social platforms

The most popular networks have been integrating AR gradually as it has become so popular. It all started with Snapchat and followed by Facebook and Instagram. Now, they keep releasing updates of their applications with AR filters, AR games... Recently, Youtube has offered the possibility of using AR facial filters in real time to the Stories tool, similarly to the ones offered on Instagram or Snapchat (Europapress, 2019). Some other apps also use this tool like the Korean ones SNOW, which started being a copy of Snapchat but now some features were retired and has a clear emphasis on beauty, or Camera360 (Moreau, 2019). According to Marenco (2018), filters are illustrations overlaid on the image provided by a camera. Several digital elements (as cartoons, stickers or small texts) that act upon the user's selfies and transform them.

The day Snapchat filters came out was September 15th, 2015. They did not announce it anywhere, they just enabled this feature on the platform where users could use puking rainbows or zombie lenses (Wojdylo, 2016). These filters did not involve any company so they were not branded.

Later on, on May 16th 2017 Instagram introduced 8 non branded filters in which a math equation swirling or furry koala ears were overlaid on users faces (Instagrampress, 2017).

Trying to classify the kind of filters that exist on social media two main types are found. Firstly, the face filters which have been the most successful ones, which overlay computer generated images on real faces using a camera (Chacon, 2018). Due to its success companies have started to use them to promote themselves on social media. Instagram announced in May 2018 that it wanted to make its platform available for big brands and celebrities to use their face filter design tools. Ariana Grande, Liza Khosy, BuzzFeed and the NBA were the first ones to take advantage of this. After that, many more brands and artists (Vogue, Kylie Jenner, Gucci…) have followed this trend, which is fun and a good way of advertisement at the same time (Sebastián, 2018). Another example is the Nike campaign to promote the launch of their new sneakers (Nike Air Max). The sports clothing and accessories company developed a new platform (Nike PhotoID), where people could upload pictures of themselves using the filters provided by Instagram in order to customize them with their favorite colors.

After that, they could opt for their sneakers model and the application created the customized sneakers. This would be a clear example of a campaign that, besides opening a new sales channel (the platform itself) it involves users in the generation of massive content.

Figure 2.10. Branded face filters (Chay Lazaro, 2018)

At the same time Snapchat introduced the Shoppable AR feature which allows advertisers to show their products through the app's filters, according to TechCrunch (Heater, 2018). But it was three years before that when Snapchat first let companies create branded filters on the Lens platform.

Some examples are when Thirty Seconds to Mars created a filter to promote their song "Walk on Water" (Statt, 2018) or when the confectionary brand Cadbury Creme Egg made a filter on which the creme eggs were spilled out of users' mouths (Charles, 2016). Facebook, for instance, has also worked with HBO for an advertising of Game of Thrones creating a filter on Facebook which transformed users faces into the Night King one (Sloane, 2017).
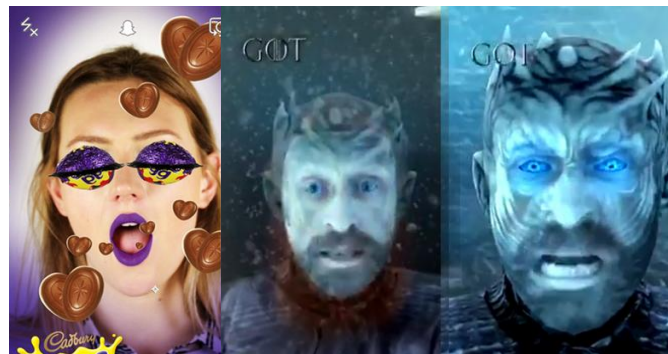
Figure 2.11. Cadbury filter (Gemma Charles, 2016) and GOT filter (Garett Sloane, 2017).

The second type receives the name of geofilters as when a user takes a picture in the location a certain company has chosen, he/she will be able to see the filter. As it is shown in the images below, filters can be thematic. In the left there is one advertising from an airline. The second one is advertising a sports event in LA. The third one shows a filter that users can create, for instance, a birthday or a wedding.
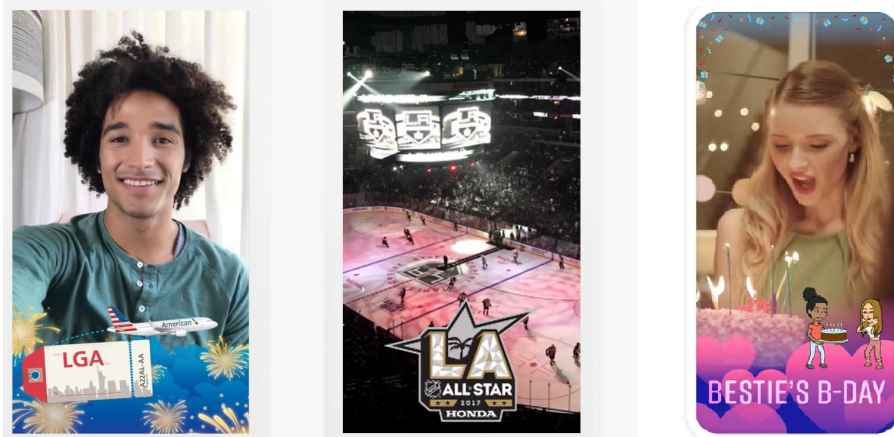
Figure 2.12. Snapchat geofilters

Currently around a billion of filters are seen daily on average (Snap Inc, 2018). From the companies' side, filters allow customers to publish when, where and how they use their products. When creating a firm creates its own filter, it creates recognition, support and awareness on its own brand. Big companies like Budweiser, BMW or McDonald's can disburse up to a million euros per day of use of this advertising tools (Marenco, 2018). According to Wallaroomedia (2019), Snapchat Sponsored Lenses cost vary depending on the day of the week between $450,000 up to $700,000 on holidays or special events. Many brands are willing to pay this amount as they know the price is worth it (MKTGsquad, 2018). For instance, the company Taco Bell made use of this tool and received more than 224 million views on its filter.

Regarding the consequences of this kind of promotions, Hootsuite states that 75% of the users of Instagram that see advertisement posts from companies get engaged with the firm, hence, the money spent on it is a worth it investment. Furthermore, about 50% of the businesses on Instagram created an Instagram Story filter during the last year. According to Adweek, "80% of the users voluntarily connect with a brand on the platform". This statement is based on the Instagram statistics from August and September 2017 when there were 180 million user interactions with businesses to search for information on products, contact details… It was already mentioned too that brands that had tried AR promotion had noticed its impact with a 30% bigger engagement rate (Blippar, 2018).

AR seems to be the future of social media advertising as it merges brands into consumers lives and leads to a lasting impression on consumers. With traditional advertising the public only hears about brands, however with social media, they actually talk about the brand (MKTGsquad, 2018).

3. Definition of the variables

In this section, the variables that will be used in the questionnaire are described and analyzed. These variables are the perceived enjoyment and interactivity in the experience with facial filters, brand awareness, brand image and behavioral intentions with respect to purchases.

Perceived enjoyment can be defined as the degree of fun that is obtained as a consequence of performing an activity, in this case, using a system (Van der Heijden, 2004). Therefore, it is the fun a person can have when playing with an application (Cacho-Elizondo, 2019). In this case, it can be understood as the extent to which fun can be experienced when using the underlying technology, AR facial filters. It relates to intrinsic motivations and focuses on the pleasure and satisfaction coming from the AR experience (Balog and Pribenau, 2010). It is said that when this variable is found on a user, a higher intention to use a particular system is given (Davis, 1992). As it was already mentioned, some of the advertising carried out nowadays fails to engage consumers as they perceive it as something annoying and they restrict to hearing from it, however, when a new filter is launched on social media, users are looking forward to find out what new funny face-changing effect the filter has. Therefore, it leads to curiosity and desire to be entertained by it (MKTGsquad, 2018). At the end of the day, the main reason why people use them is simply that they are fun (Animalz, 2017). In addition, if users try and like them, they share their interactions with their friends for their own enjoyment. The advantage of this is that consumers are not forced to see advertisements, they have the free election to use the filters or not and this makes the perceived enjoyment higher (MKTGsquad, 2018). Jason Stein, CEO of Laundry service, a marketing agency, stated "*It's funny because you don't think of a goofy taco face as a premium ad buy; you'd probably think of a beautiful HD video. But they're really fun and I don't think you can point to many types of ads and say 'wow, I had a fun time with that ad.' And in having fun, people are becoming brand ambassadors for you, sending it to all their friends with your brand on their face.*" (2016). This variable has been measured through six items (Van der Heijden, 2004) which were adapted for the context of study. All the items used seven-point Likert scales, ranging from 1 "totally disagree" to 7 "totally agree" was used.

Interactivity, as it was mentioned when defining the AR experiences creation steps, can be understood as the ability of the users to modify the content displayed in the environment to influence the virtual experience in real time (Steuer, 1992). Higher levels of interactivity create a feeling of autonomy and control in the users' experiences, enhancing the enjoyment and value obtained from using the determined technology (Jiang and Benbasat 2007; Animesh, 2011). AR brings a more interactive advertising as it allows to manipulate the environments as consumers wish and even become a part of it (Neosentec, 2019). Some filters are activated when the user makes a noise, opens the mouth or raises an eyebrow. The filter is considered interactive if it requires facial movement to display the features, meanwhile, static ones do not offer extra functionalities (it just displays what is seen initially. Snapchat has been making its filters more interactive by creating games. One example is one in which Snapchat gives a list of things and the user has to say whether he/she has done them or not. After that, it takes a picture making a collage with the images to share them (Pinegar, 2018). This variable has been measured through 4 items from Animesh (2011).

Brand awareness (recognition), as previously mentioned, is related to how much a brand is recognized by consumers and refers to the cognitive dimension. One of the purposes of firms is to make a brand earn visibility, be well recalled by the public and differentiate it in the market. This variable helps when analyzing how companies are associated with the products they commercialize. A high brand awareness is what makes many consumers say Kleenex instead of tissue paper or Gillete instead of razor blades (Coutinho, 2017). Improving customers relationships offering innovative experiences, adding a surprise factor, encourages interest and develops awareness for the brand (Neosentec, 2018). The combination of AR and advertising has proven to be very useful to improve the memory and perception of a brand. What is interesting is the fact that AR is becoming a brand awareness tool to find more advanced marketing phases that are closer to achieving a sale (Dans, 2018). Moreover, social media has a multiplier effect that can help when trying to make a brand visible (Animalz, 2017). In this case, the variable has been measured through 3 items from Yoo Donthu (2001).

Brand image is defined as "*perceptions about a brand as reflected by the brand associations held in consumer memory*" (Keller, 1993, page 3) and relates to the affective dimension.

Therefore, it alludes to the feelings and emotions that a firm causes on customers and as a consequence to the value of it perceived by the public. It is composed by a set of tangible and intangible elements that represent the values that the company wants to transmit to consumers. Nowadays, what makes a brand differentiate in the market is to trigger emotions, feelings and values that are transmitted through the brand image (Madurga, 2016). AR can be a powerful tool to strengthen the brand image of a firm and engage their public on a new level (Paine, 2018). Face filters on social media give brands the opportunity to explore new advertising mechanisms while users can literally play with a brand's image (Animalz, 2017). This variable has been measured through 6 items from Low and Lamb (2000).

Finally, the last variable concerns the **behavioral intentions** with respect to purchasing the product offered in the AR face filter. This variable refers to the conative dimension. A purchase intention is the consumer's plan or intention to make an effort to buy a certain product (Spears and Singh, 2004). Furthermore, when talking about online shopping, it refers to whether customers are intending to purchase or recommend that product through online platforms (Pavlou, 2003). These intentions are usually affected by attitudes towards the brand according to Long-Chuan Lu, Wen-Pin Chang and Hsiu-Hua Chang (2014). According to a research carried out by Rachel Yang (2018), by creating a connection between the user and an ad with brand filters firms can increase the purchase intention. When users look at a brand filter with a picture taken by himself/herself, the ad is perceived as self-expressive and it triggers a feeling of self-endorsement that increases the chance of purchasing. Additionally, this technology assists the user throughout the purchasing process, reducing the uncertainty of the user by allowing him/her to observe products on their bodies (Dans, 2018). In some cases, like Gatorade with their Super Bowl campaign on Snapchat, it results in an increase on the purchase intent (Accessar, 2018). This variable was measured with 6 items from Lu, Chang and Chang (2014).

4. Methodology and results

4.1. Design of the survey

In order to analyze users' experiences with social media AR face filters, a survey with all of the variables of interest previously mentioned was conducted. A total of 401 participants answered all the items of the survey regarding the variables or interest. The survey was divided into 8 sections. In the first one, there was a small introduction containing a brief explanation about what AR is and how social media networks have been introducing this technology through face filters and brands have been leveraging it. Secondly, the individuals were asked to indicate whether they had ever tried AR face filters and, if that was the case, if they were promoted by a brand or were regular ones. Consecutively, they found a section regarding their behavior on social media (frequency of use, social networks they had seen face filters on and frequency of use of those filters). The selected networks that were asked about in the questionnaire were Facebook, Twitter, Instagram, Snapchat, TikTok and Youtube as they are some of the most popular.

After that, the following two sections asked questions regarding perceptions (enjoyment and interactivity) and behavioral intentions of the participants. Next, the latter two sections asked about variables of interest related to the brands (only for participants who had used branded face filters previously). Therefore, the subsequent questions examined which branded filters the participants recalled and the sectors from which they come. Moreover, and with the purpose of analyzing the impact of this technology on brands, the subsequent variables were analyzed: brand awareness, brand image and behavioral intentions. To finish with, the last section consisted of some sociodemographic questions concerning the gender, age, level of studies and daily usage of social media.

The sampling method used to perform the questionnaire was a convenience one. This sampling method is a non-probabilistic technique where the subjects are selected according to the convenient accessibility and proximity of them for the researcher. This method led to the snow ball one, as the subjects that performed the survey were asked to identify more people that had a similar interest range and led to a chain reaction (Explorable, 2019).

Nowadays, online surveys have become very popular and it can be said that they are the most used method for data collection in researches (Murillo, 2019). However, this method has both advantages and disadvantages.

On the one hand, this research method benefits from the short period of time that is required to gather information and the low cost and simple treatment in the data analysis. Furthermore, it is characterized by the reduced interviewer bias, the easiness to be applied and the fact that they allow to obtain useful information directly. On the other hand, some disadvantages of performing a survey is that participants can refuse to collaborate what, as a consequence, can jeopardize the data collection. Furthermore, participants might be influenced by the instruments used to collect information and might be biased in sensitive topics (Murillo, 2019).

The final sample was made up of 401 participants who answer the previous questions regarding their previous experiences with AR face filters on social media.

4.2. Results of the analysis

The section will be subdivided according to the different set of questions carried out in the questionnaire.

4.2.1. Sociodemographic characteristics of the total sample

First of all, and in order to better understand the results derived from the research, the sociodemographic characteristics of the sample will be briefly commented. As it can be seen on Table 4.1, more than half of the contestants were female (67%) and a 33% were male. In addition, more than half of the contestants were between 19 and 25 years old (53.6%). The other half is divided between the rest of the ages with higher percentages in people younger than 18 and between 47 and 54. With regards to the level of studies, all the contestants had undertaken some kind of education, being most of the contestants either university students that were currently studying a degree or had already finished it. The remaining percentages were more or less evenly distributed between primary school, high school students or contestants possessing a PhD.

Table 4.1. Sociodemographic characteristics of the sample

Variables	Number	Percentage
Gender		
Female	270	67.33%
Male	131	32.67%
Age		
Less than 18	64	15.96%
Between 19 and 25	215	53.62%
Between 26 and 39	34	8.48%
Between 40 and 55	66	16.46%
Older than 55	22	5.49%
Education		
No qualifications	0	0.00%
Primary school	39	9.73%
High school/ VET training	62	15.46%
University (currently undertaking)	146	36.41%
University (finished)	107	26.68%
PhD	47	11.72%

4.2.2. Social media use characteristics

Regarding the frequency of social media use in the total sample, it was found that a minority of individuals claimed to use it more than 5 hours (11.7%), the majority use it between 1 and 4 hours daily (66.1%) and the amount of individuals that use social media for less than 1 hour is 22.2%. This can be due to the fact that the vast majority of the contestants were youngsters and, out of those, around 80% showed high frequencies when talking about social media usage. In contrast to this, 96% of the older contestants (between 40 and 55 years old) displayed frequencies that fluctuated around less than 1 hour and 2 hours.

Moreover, regarding participants' previous experiences with the AR filters on social media, results showed that 43% of them had tried filters but they were non-branded, 28.7% had used branded filters before and 28% had not used this kind of technology ever.

To go a deep further into this information, the sample will be reduced to the individuals that had tried filters before. Their behavior with regards to the different social networks will be studied. Therefore, out of the 401, 289 contestants that had already tried filters on social media represent the following frequencies of use of the selected networks.

Firstly, the most revealing factors were that Instagram and YouTube were the networks that participants reported to use the most frequently with 85% and 59.6% respectively, claiming to use them daily. In the case of YouTube, 28.7% stated to use it but not as frequently. In these cases, a tiny minority alleged to never use it or not to have a profile as it can be seen in Table 4.2.

In contrast to this, the networks that came up as the least successful were Snapchat and, especially, TikTok. In the case of Snapchat, it was found that the network within the filters users as a 46% never use it and a 25.6% do not even have a profile. Regarding TikTok, the results showed that it is an unknown and unpopular network due to the fact that almost the whole sample never use it (42%) or do not have a profile (54.7%). Only a minority affirmed to daily use them, being in the case of TikTok just 1% (see Table 4.2).

Finally, in the cases of Twitter and Facebook, the results were evenly distributed between the answers of never using them or not having a profile and the frequent usage ones, being Facebook a bit more popular than Twitter.

Table 4.2. Frequency of use of social networks

	Facebook	Twitter	Instagram	Snapchat	TikTok	YouTube
No profile	10.38%	22.14%	5.19%	25.60%	54.67%	6.22%
Never	28.37%	34.60%	2.42%	46.36%	41.86%	5.53%
1-3 days	29.75%	16.60%	7.26%	16.95%	2.42%	28.71%
4-7 days	31.48%	26.64%	85.12%	11.07%	1.03%	59.51%

The subsequent step consisted in analyzing the percentage of individuals that had already tried any kind of filters per social network, so that the networks on which most participants have experienced this technology can be found.

As it can be seen on Table 4.3, the networks on which the relationship between the ownership of a profile and the previous experience with face filters (both branded and non-branded) was higher were Instagram and YouTube, followed closely by Facebook, Twitter and Snapchat. The one that had the lowest correlation was TikTok. It should also be highlighted that the number of participants that had tried non-branded filters is bigger than the ones reporting to have used branded ones, being this difference the most significant in the cases of Instagram and Snapchat. A total of 174 individuals claimed to have tried the non-branded filters against 115 that had tried the branded ones.

Moreover, in the case of Instagram, a chi-square test was performed and revealed an association between the participants' profile on Instagram and the type of facial filter used ($\chi^2(1) = 4.623$, $p < 0.05$). Results showed that there are more users who had used non-branded filters than branded ones on Instagram, and that these differences were significant. The same test revealed similar results for Snapchat ($\chi^2(1) = 8.274$, $p < 0.05$), thus, showing an association between Snapchat users and the non-branded filters too.

Concerning TikTok, a chi-square test was performed too with a result of $\chi^2(1) = 3.611$ with a significance level bigger than 0.05 ($p > 0.05$), showing a non-association between members' profile on TikTok and type of face filter used. This means that previous experiences with branded or non-branded filters was not different depending on having a TikTok profile or not. Similar results were gotten for the rest of networks since the differences were non-significant.

Table 4.3. Relationship between previous experiences with filters and profiles on social media

PREVIOUS EXPERIENCE WITH…	FB PROFILE	TW PROFILE	IG PROFILE	SC PROFILE	TK PROFILE	YT PROFILE
… BRANDED FACE FILTERS	37%	31.80%	39.10%	33.20%	20.80%	38.10%
… NON-BRANDED FILTERS	52.60%	46%	55.70%	41.20%	24.60%	55.70%
… FACE FILTERS	**89.60%**	**77.90%**	**94.80%**	**74.40%**	**45.30%**	**93.80%**

Moreover, a T test revealed an association between the number of profiles on social media and the type of face filter used, revealing that users who used branded filters have more profiles in social media (M = 5.02) than the ones who used non-branded filters (M = 4.58), and these differences were significant (t(287) = 2.88; p < 0.05).

4.2.3. Interactivity and enjoyment with face filters in general

In order to analyze whether the contestants perceived the variables interactivity and enjoyment when using the face filters, one sample T tests were performed. The results of the tests, comparing the average values with the middle point of the scale (4), were significant for enjoyment (t(288) = 7.451, p < 0.001), but not significant for interactivity (t(288) = -0.415, p = 0.678). That is, the respondents perceived face filters in general as highly enjoyable (M = 4.63; SD = 1.44) and with medium levels of interactivity (M = 3.96; SD = 1.77).

After having found this, the same test was performed but, in this case, taking into account the different types of filters (branded vs. non-branded).

The results of independent samples T tests, comparing the average values between non-branded filters and branded filters, were marginally significant for interactivity (t(287) = 1.734, p < 0.1), but not significant for enjoyment (t(287) = 1.053, p = 0.293).

Therefore, there was not a significant difference in the enjoyment perceived between branded and non-branded filters but there was for the interactivity. The enjoyment perceived with both was similar but in the case of interactivity the levels were higher for branded filters than for the non-branded ones (see Table 4.4).

Table 4.4. Interactivity and enjoyment perceived with filters

	Previous experience	N	Average	Standard deviation
INTERACTIVITY	**Branded filters**	115	4.178	1.684
	Non-branded filters	174	3.810	1.816
ENJOYMENT	**Branded filters**	115	4.740	1.499
	Non-branded filters	174	4.558	1.397

4.2.4. Variables perceived from branded face filters

Focusing on participants who had previously used brand filters (N = 115), we first take a look to the brands the contestants recalled to have seen promoting themselves through social media face filters. With that aim, a word cloud was created to see which words were the most repeated, such as Kylie Cosmetics, Adidas or Nike as can be observed on the Figure 4.1.

Figure 4.1. Word cloud with the most remembered brand filters

In addition, the variables related to the brands will be analyzed. As can be seen on Table 4.5, the variable with the highest average and therefore, the one that was more perceived by the participants was enjoyment, followed closely by the image and brand recognition. In contrast, the purchase and recommendation intention were less significant for the contestants as the values for these variables did not surpass the average value (4). Furthermore, compared to the average values, they were significant for enjoyment ($t(114)$ = 5.296, p = 0.000), image (($t(114)$ = 4.432, p = 0.000), purchase intention (($t(114)$ = -4.771, p = 0.000) and recommendation intention (($t(114)$ = -4.016, p = 0.000). However, they were not significant for interactivity ($t(114)$ = 1.135, p = 0.259) and brand recognition ($t(114)$ = 2.522, p = 0.013). Therefore, contestants claimed to highly enjoy face filters when using them and to find firms that make use of them as friendly, modern, useful, etc.

Nonetheless, besides this, they did not express a willingness to recommend or purchase from that firm after using them. Concerning the filters' interactivity and brand recognition, medium levels were noted from the results of the analysis.

Table 4.5. Average values of the variables perceived with branded filters

	N	Average	Standard deviation
INTERACTIVITY	115	4.178	1.684
ENJOYMENT	115	4.740	1.499
BRAND RECOGNITION	115	4.382	1.627
BRAND IMAGE	115	4.64	1.553
PURCHASE INTENTION	115	3.21	1.772
RECOMMENDATION INTENTION	115	3.336	1.772

Finally, in order to further analyze the data obtained regarding the perceptions and behavioral intentions resulting from the use of these AR branded face filters, Pearson correlations were employed to analyze the interdependencies between the variables and the degree of covariance lineally related. All the correlations showed in Table 4.6 are significant ($p = 0.000$). Results reveal that the most correlated variables were purchase and recommendation intentions, meaning that most of the contestants that stated they would purchase a product after using the filters would also be willing to recommend it. Furthermore, the individuals that showed high brand recognition values also showed high values for brand image and recommendation intention. In contrast, the values that appeared to be the most independent were the enjoyment and the recommendation intention. That is, the individuals that perceived high enjoyment values from face filters did not show a willingness to recommend them. However, enjoyment is highly related to brands' perceptions, as brand recognition and image.

Table 4.6. Correlations between the variables perceived with filters

	INTERACTIVITY	ENJOYMENT	BRAND RECOGNITION	IMAGE	PURCHASE INTENTION	RECOMMENDATION INTENTION
INTERACTIVITY	1	0.512	0.487	0.496	0.471	0.429
ENJOYMENT	0.512	1	0.554	0.604	0.437	0.39
BRAND RECOGNITION	0.487	0.554	1	0.809	0.606	0.603
IMAGE	0.496	0.604	0.809	1	0.586	0.577
PURCHASE INTENTION	0.471	0.437	0.606	0.586	1	0.924
RECOMMENDATION INTENTION	0.429	0.39	0.603	0.577	0.924	1

5. Conclusions

The objective of this study was to analyze the impact of AR face filters in social media on brands' perceptions and behavioral intentions. We review previous literature to better understand the current situation of AR as a cutting-edge technology that is becoming progressively more well-known. The term has existed since the 1950s, when it was a weak, costly and not very popular technology. Nonetheless, it has evolved and, due to the latest advances in the smartphone industry and with the mobile applications, it has gained a special relevance during the last years. Companies have found in it an effective marketing tool and more and more are making use of it.

Depending on the way in which the technology is applied, different types of AR can be found such as marker-based, marker-less, location-based, projection-based and superimposition-based. It can also be used through different devices such as head up displays, holographic displays, smart glasses or handheld devices. Firms can create positive customer experiences adapting the most suitable type of AR to their strategy as it allows users to interact with the brand. AR has been proven to play an important role when attracting customers' attention, creating brand awareness and fostering user-brand engagement. Studies have found that brands that have used it have observed an important increase in the engagement rate (Blippar, 2018).

In addition, it is known that the number of users of social networks is increasing, especially on platforms like Facebook or Instagram. In contrast, Twitter or Snapchat are losing their popularity. However, most of them have been gradually introducing AR to offer users different experiences in the shape of face filters. Those filters overlay digital elements on a camera's image, being the image a face (face filters) or just a regular image depending on the location (geofilters). The ones that are becoming trendier and increasingly used by brands to promote themselves are the first ones. Brands have realized that these filters create recognition, support and awareness among users, who find them enjoyable, and that is why the use of it is expanding throughout them.

According to the results of our analysis, the information regarding how users perceive these filters is amplified. It was observed that most of the young contestants make use of social media very frequently and that a 71,4% of the sample had tried the above-mentioned filters on those networks.

Therefore, the popularity of them is confirmed. Out of the total sample, only a 28,7% had tried branded ones, therefore, although it is becoming popular, it might not be an exploited service yet and, thus, firms have an opportunity here to offer something new to their public.

Concerning the most used social network and on which most individuals had already tried face filters, we find Instagram as the most successful in this sense. Accordingly, brands that want to try to promote their products like this can opt for this network as it seems to be the most successful one and leave aside others like TikTok or Snapchat. Concerning Facebook and Twitter, contestants were ore indifferent about them as the frequencies of use were intermediate but many of its users had tried the filters. Some brands appear here as the ones that have been more successful with their AR face filters, since they are the most mentioned by participants. Among them, it should be highlighted that Kylie Cosmetics, Nike or Adidas were mentioned by the majority of participants and, therefore, it is clear that their brand awareness was benefitted from the filters at least due to the fact that users remembered them.

Putting an emphasis on the variables observed, branded filters were perceived as more enjoyable and interactive than non-branded ones. However, the contestants found in both cases (branded and non-branded) the filters to be more enjoyable than interactive. Consequently, firms could work on making the filters more interactive to improve the experience. Taking a look at the items regarding interactivity and its scores, firms could achieve the improvement of this variable by allowing users to modify the surrounding content or influence the way in which the environment looks. It might be that branded filters are more static as they do not have extra functionalities when there is facial movement, so this is a feature that branded filters can enhance in the future. Brands could put an effort on making the filters more interactive by giving the option to influence or affect the surroundings displayed on them with the facial movement to gain a bigger acceptance from the consumers. This could also affect positively in the enjoyment perception and the behavioral intentions of the consumers. As it was commented when describing this variable, one way of making the filters more interactive could be by creating games related to what the brand would be trying to promote.

The use of these AR filters has also proven to positively affect the brands' image and awareness. However, participants were not very convinced to recommend or purchase after using them.

Taking a look at the correlations between the variables, by making the filters more enjoyable and interactive, users can better recognize the brands and have a more positive image about them, so the willingness to purchase or recommend these brands could increase. To increase these behavioral intentions, brands could set a purchase option through which users could be directly redirected to the brands' site after trying out a product on their cameras.

Despite the interesting results of this undergraduate dissertation, we should indicate some research limitations that will offer some future research lines. Firstly, the sample of the study was selected through a non-probabilistic method and thus, out of the 401 contestants, 215 were between 19 and 25 years old. Although this segment of population is the one that most uses these AR face filters (Pinegar, 2018), future research should try to generalize these results to the rest of age ranges.

Additionally, and concerning the variables analyzed in the questionnaire, it can be mentioned other factors that may have an influence on users' perceptions and that should be taken into account in future research (e.g. creativity or originality). Finally, it would be interesting to differentiate and compare brands according to the sectors they belong to, as these AR face filters can be more useful in some industries than others, such as the retail one (Gannon, 2018).

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