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A New Virtual Reality Experience for Portuguese Football fans: Testing the Factors Leading to Adoption Based on TAM

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Abstract

Virtual reality is a promising technology with the potential to disrupt the football industry since fans are seeking new ways of getting a home-watching experience closer to the real experience. This study tests the concept of a new virtual reality football experience by means of using the extended technology acceptance model to determine the factors that lead to the adoption of virtual reality equipment. The virtual reality experience is intended to simulate the real experience of attending the stadium in a matchday. Data was collected and 203 valid responses were obtained. The results were analysed using structural equation modelling, which allowed predicting purchase and use intentions. Findings suggest that perceived usefulness, perceived enjoyment and attitudes are strong predictors of the outcomes. Moreover, the results support the potential of virtual reality and its integration in sports. This study paves the way to further research on this matter and provides several insights and recommendations for sports organisations about whether offering the experience is viable or not and possible approaches to different segments of the Portuguese football fandom.

Keywords: Virtual reality; Football spectatorship; Technology Acceptance Model; Football Industry; Purchase Intention; Use Intention

Sumário Executivo

A realidade virtual é uma tecnologia promissora com o potencial de revolucionar a indústria do futebol tendo em conta que os adeptos estão cada vez mais a procurar uma nova experiência de ver futebol em casa que seja semelhante à experiência real. Este estudo testa o conceito de uma nova experiência de realidade virtual aplicada ao futebol através da extensão do modelo de aceitação de tecnologias (TAM) para determinar os fatores que conduzem à adoção de equipamento de realidade virtual. A experiência de realidade virtual testada neste estudo simula a experiência real de ir ao estádio em dia de jogo. A recolha de dados permitiu obter 203 respostas válidas. Os resultados foram analisados usando um modelo de equações estruturais (SEM) que permitiu prever as intenções de compra e de uso. Os resultados sugerem que a perceção de utilidade e perceção de divertimento e as atitudes determinam fortemente as intenções. Este estudo abre caminho para futuros estudos neste tópico e fornece vários indicadores e recomendações às organizações desportivas sobre se devem incluir esta experiência na sua oferta e possíveis abordagens a diferentes segmentos da massa adepta em Portugal.

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1. Introduction

The context in which this research takes place is the Portuguese football consumers, more specifically those who watch the match at home. The VR market is expected to grow to €108 million by 2020 and devices are increasingly more affordable allowing companies to create richer VR experiences comparing to the existing YouTube 360-degree videos of highlights or NBA full-games in VR devices which are still limited since one can only spectate from a static point of view (D. Kim & Ko, 2019). VR technology is growing fast and is currently being used in manufacturing, medicine, art, navigation, education, gaming, military, but in the sports industry, it is still in a very early stage or even non-existent in most of the sports and leagues. The European football industry valued at €28.4 billion (Barnard, Boor, Winn, Wood, & Wray, 2019) is also growing at a fast pace, more than the global GPD (Performance Communications, 2016). In 2018, matchday represented only 13.4% of Portuguese Primeira Liga clubs revenues showing that this revenue stream is being underexploited by Portuguese clubs comparing to top ten European leagues (Barnard et al., 2019). While attendance is decreasing in stadiums, the ticket prices are increasing for the same viewing experience in the stadium (Performance Communications, 2016) and sports consumers are desperately seeking new ways of getting a home-watching experience closer to the real experience (D. Kim & Ko, 2019). Moreover, the actual TV experience lacks telepresence, thus, negatively affecting the flow of the experience of watching sports and, consequently fans' satisfaction (D. Kim & Ko, 2019). Therefore, this study commits to develop a VR experience tailored to Portuguese football consumers and to assess the factors leading to their adoption of the technology. VR should be seen as a complement rather than a substitute for the real experience (Deng, Unnava, & Lee, 2019) and this would be especially interesting for the tons of fans that cannot attend their team's stadium due to several reasons but it is mainly geographic. Both, strongly and weakly connected fans to sports are important. The former are more likely to attend games, actively participate and consume sports media, show higher levels of willingness to pay and loyalty (Performance Communications, 2016). Weakly connected is a huge segment and these fans are there for the sociability and entertaining experience which represents good news due to the novelty and high hedonic benefits presented by VR experiences. This means there is a lot of potential for the creation of a VR experience that includes a virtual world corresponding to the inside and in the surroundings

of the stadium where individuals represented by avatars can interact with each other and enjoy a football experience in the stadium with their friends or just meet other fans and, to participate in the co-creation process. Therefore, this would not just continuously improve the VR experience but also the real experience.

Most of the studies in VR technologies are more psychology-related and focused on the factors that contribute to the feeling of presence that contribute to the flow of the experience. Moreover, other studies focus on the device itself rather than in the experience or the type of VR content. Most of the applications were in the tourism industry and this study pretends to assess fans' dynamics and antecedents that lead to VR adoption by football fans which is a different type of consumption and loyalty towards a very particular product. Therefore, this study pretends to fill some of the gaps on VR and sports literature.

The purpose of this research is to design and test the concept of an immersive VR football experience which is similar to the real experience of attending the stadium in the match-day and it is targeted to those consumers who watch the game at home. To address this, the following research questions was defined: "What are the most significant factors influencing the adoption of VR by Portuguese football consumers?"

To explain the way the above research question is going to be answered, five main objectives were defined. First, to develop the concept of a VR experience in football in which users could experience the match-day with whom they wanted like if they were really attending the stadium. Second, to test the adoption of this new concept leading to a third objective which is to understand the factors influencing adoption of VR from those consumers who usually watch the game at home. Fourth, to develop a version of TAM applied to VR in sports. Finally, this study aims to propose recommendations for sports marketers and Portuguese football clubs.

2. Literature Review

2.1. Reality-Virtuality Continuum: A review of concepts

Flavián, Ibáñez-Sánchez and Orús (2019) recently proposed an updated version of the Reality-Virtuality Continuum developed by Milgram and Kishino and state that there are several mediated realities between real environment and virtual environment, both extremes of the spectrum. In the middle, Augmented Reality (AR), Pure Mixed Reality (PMR) and Augmented Virtuality (AV) can be ordered by the increasing mediation effect of technology on reality. This study is going to focus on VR and highlight some aspects of AV. In the real environment, individuals only interact within the real world directly or indirectly (through a video display) while the virtual environment (known as VR) is purely computer generated and individuals interact only with virtual objects in real time. Loureiro, Guerreiro, Eloy, Langaro and Panchapakesan (2019) propose a similar definition stating that VR is the environment "in which the participant-observer is totally immersed in a completely synthetic world, which may or may not mimic the properties of a real-world environment". A less studied mediated reality is AV in which content and elements of the real world overlap the virtual environment, contrary to the AR case in which digital content superimposes the real world (Flavián et al., 2019).

2.2. VR Technologies Categorisation

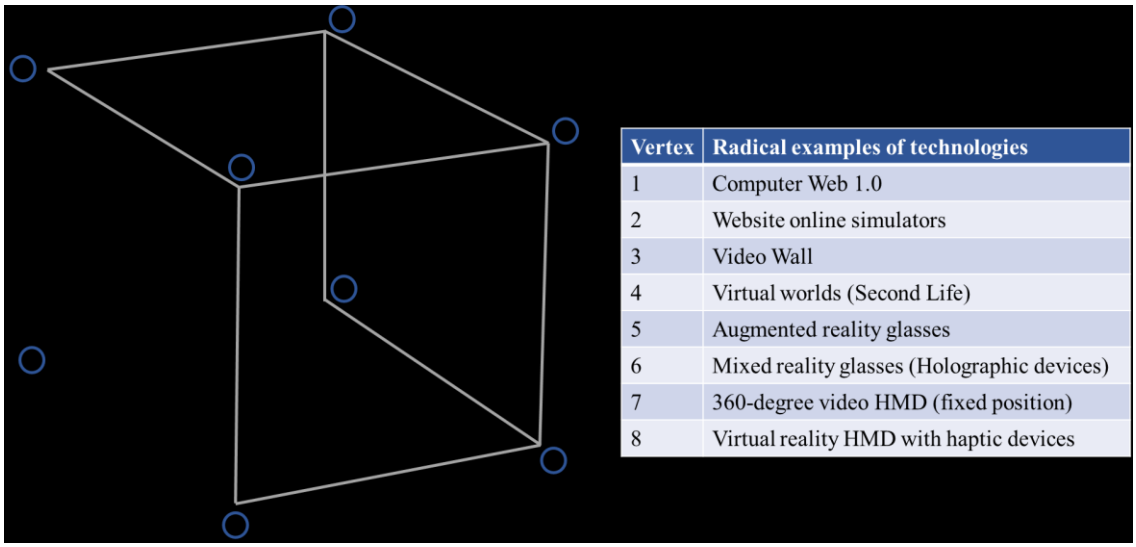
2.2.1. Human-Technology Interactions

As an evolution of Human-Computer Interaction framework, Dix proposed in 2017 the Human-Technology Interaction (HTI) framework in which technologies associated with mediated realities can be sorted according to three main factors: a technological factor (embodiment), a human factor (presence) and a behavioural factor (interactivity) (Flavián et al., 2019). The technological embodiment continuum ranges from stationary external devices to implanted devices. Nowadays technologies are "not only smaller and portable, they are also wearable", improving users' "sensory, cognitive and motor functions" (Flavián et al., 2019). Technology is moving towards embodiment which allows users to integrate devices into their bodies culminating in more immersive (Flavián et al., 2019) and time distorted experiences (underestimation of a time interval by the users) as a result of the high

focus on the activity and the holistic satisfaction (D. Kim & Ko, 2019). Presence, the second factor, is defined as the user's sensation of being in an environment different from the physically real environment and can be triggered by internally embodied devices (implanted or wearable, eg: VR glasses, gloves) to a greater extent, due to their higher immersive capacity and sensory attachment, than externally embodied devices (stationary and portable, eg: computer, smartphone) (Flavián et al., 2019). The third factor is interactivity which can be defined as the user's capacity to modify a mediated environment (Steuer, 1992) and receive feedback on their actions on it in real time (Deng et al., 2019). The interactivity between the user and the technology can also be analysed with a continuum ranging from low interactivity only allowing the user to navigate in the mediated environment, to high in which the user can modify and control it (Flavián et al., 2019).

2.2.2. EPI Cube Framework For The Classification Of Technologies

Based on HTI, (Flavián et al., 2019) developed Embodiment-Presence-Interactivity (EPI) framework (Figure 1) which takes a cubic form to position each technology in accordance with the three factors allowing managers and researchers to better select devices and understand their impacts on the consumer experience. Different types of VR experiences can be analysed through this framework. Looking at Flavián et al. (2019) framework, videogames and virtual worlds (eg: Second Life) played in external devices allow the user to manipulate the virtual environment and to get immersed in the experience, although, external devices establish a barrier between the real and the virtual world, therefore, the experience is high on presence and interactivity dimensions but low on embodiment. Other examples are 360-degree video from a fixed position and VR Head-mounted display (HMD) with haptic devices, both offer an experience with high levels of presence and involvement but the former is low on interactivity while the latter is high. These devices include accelerometers and gyroscopes that track a user's movement and position the environment accordingly and, although not so developed, some devices allow a physical or quasi-physical interaction through haptic gloves (Loureiro et al., 2019).



Vertex	Radical examples of technologies
1	Computer Web 1.0
2	Website online simulators
3	Video Wall
4	Virtual worlds (Second Life)
5	Augmented reality glasses
6	Mixed reality glasses (Holographic devices)
7	360-degree video HMD (fixed position)
8	Virtual reality HMD with haptic devices

Figure 1 – EPI Cube framework adapted from Flavián et al. (2019)

2.3. Sports Consumption and Fan Evolution

The digital revolution that recently started in football has been changing fans habits, behaviours and attitudes and football consumption is no longer just about watching but there is a transition from a passive relationship with players, teams, events and brands to an interactive relationship (REPUCOM, 2015).

Jacobson (2003) states that 'fan', which derives from the word 'fanatic', refers to an individual who is "an ardent devotee of sport" with an affiliation that generates an emotional connection and value derived from group membership. While the fan is interested in following specific sport, team and/or athlete, 'spectator' is the term for those who actively follow a sport event without the degree of devotion of a fan. Fan identification concept derives from the social identity theory which suggests that an individual perceives and categorises him/herself depending on his/her social and personal identities (Jacobson, 2003) and these identities affect behaviour (Rynarzewska, 2018).

Theodorakis, Wann, Nassis and Luellen (2012) suggest that an individual becomes a fan because of the 'need to belong' which implies that an individual forms and maintains strong and stable interpersonal relationships by becoming affiliated to an organisation. Moreover, people have a necessity for frequent, stable, pleasant, emotionally involving and long lasting connections with others and fans use sports to satiate this socialising need either when attending a sport event in stadium with others with whom they feel a strong bond, even if

they are unknown, or when watching it at home with friends. Fandom is unique in the sense that it allows individuals to experience "pure sociability, quasi-intimate relationships and sense of belonging" (Melnick, 1993) because before being a group, the group of fans already possess commonalities such as the loyalty and identification with the team (Jacobson, 2003).

Fans enjoy sports to escape from everyday life and its problems, to get entertained, for economic factors, due to affiliation and family needs (Jacobson, 2003) or even because of homesickness (Theodorakis et al., 2012), but sports fandom offers a myriad of other benefits such as "increased frequency of feeling of positive emotions" contributing to one's personal development by helping people to better cope with feelings of depression, alienation and disappointment (Branscombe & Wann, 1991). How does an individual chooses to identify with a team? Wann, Tucker and Schrader (1996) state that there are four main factors influencing the origination, continuation and cessation of identification with a sports team, namely, geography factor also due to the increased media exposure given to the local teams; teams followed by friends and family; team achievements and success and; players' abilities and traits and players exit.

In terms of gender, women are more likely to actively consume a certain sport due to their friends and family and their identification with a team is highly dependent on with whom they watch the game while the main reason for men to consume a sports fans is because they practiced it (Jacobson, 2003). However, there is no difference between genders in what concerns to passion and involvement in the viewing experience making watching sports a pleasant and shared experience when in the presence of others with similar "fanship commitments" (Gantz & Wenner, 1995).

Following the consumption of a sport is the identification with a team and fans may see the team as a quasi-brand with personality, thus influencing the level of cognitive identification with the team which positively influences attendance, the number of games watched and team-related purchases (Carlson, Donavan, & Cumiskey, 2009). Content and statistic information represent another level of sports consumption also having an "important social role for fans by providing conversational fodder between friends and strangers" (Rynarzewska, 2018), thus a trigger for sociability (Melnick, 1993). Moreover, sports fans are heavy and frequent consumers of information through several media (Rynarzewska, 2018) who are increasingly more engaged and want more "high value experiences both within and outside regular sport consumption" (Stavros, Meng, Westberg, & Farrelly, 2014).

In addition, Rynarzewska (2018) also mentions that many individuals become fans because of the desire to become experts and informed about a certain sport, team or athlete, thus, information seeking promotes the relationship between fans and sports organisations.

2.4. VR Experiences and Virtual Worlds

2.4.1. VR Customer experience and applications

Customer experience (CE) involves cognitive, emotional, behavioural, sensorial and social responses towards specific aspects of a company's offer such as a brand or technology and it comprises the contacts between the company and the customer at different touch points across customer's journey (Lemon & Verhoef, 2016). At the basic level there is the customer's core experience in which the presence of technology is limited or inexistent and a technology-enhanced experience is one in which technologies are added to the CE and directly or indirectly influence it according to their level of action on the real world. Following the support dimension comes the empowerment dimension which is related with the role of technology in creating new experiences within customers' core context and distinguishes between related empowered experiences in which the new experience provided by the technology complements the core experience while diverted empowered experiences are not directly related with the core experience (Flavián et al., 2019). Finally, there are technology-generated experiences in which the technologies themselves create new experiences that would not exist without them and it is the category of customer experiences in which VR is included. For the purpose of this study, a VR experience represents the match between VR content and VR equipment. The former is defined as a simulation of one's presence in a world, either real or imagined, while the latter is simply the equipment that allows the user to experience VR content (Manis & Choi, 2019).

VR technologies have been successfully applied in manufacturing, military, rehabilitation medicine and health, tourism, architectural planning (Loureiro et al., 2019), education and training, shopping, entertainment such as gaming and more recently in sports (D. Kim & Ko, 2019). The use of VR devices increases consumers' perceived value received by positioning them in the centre of a more dynamic experience in which they have a higher level of autonomy comparing to experiences provided by other technologies (Flavián et al., 2019). Furthermore, VR also increases the value for the partners and sponsors that use football to get closer to consumers by enhancing purchase intention which is due to a higher brand

knowledge and a more positive attitude towards the brand as a result of the hedonic benefits provided by the VR experience (Loureiro et al., 2019).

Yung and Khoo-Lattimore (2017) state that VR's ability to visualise spatial environments is extremely important in industries like tourism in which products are intangible and allow consumers to try before they purchase, resulting in more informed decisions. Therefore, VR experiences should be seen as different and complementary to real experiences.

Regarding involvement, there are two types of involvement, situational which occurs in specific situations (eg: purchase) and enduring which is a "stable trait that reflects an individual's degree of interest in, or arousal by, a product on a daily basis" (Deng et al., 2019). Furthermore, sports are an informational and experiential types of goods rather than utilitarian, people consume them mainly to satisfy psychological desires such as emotions rather than to satisfy physiological needs and, Holbrook and Hirschman (1982) suggest that the frequent consumption of these decreases their value which is in accordance with the economic principle that states the more one consumes a good the less value is extracted from an extra unit. Deng et al. (2019) found that enduring involvement affects the perceived similarity between consumption experiences, therefore, it moderates the effect of decreased interest in future consumption when it is predicted to be similar to the actual experience. Moreover, actively searching for product-related information, strong cognitive responses to product communications, engaging in word-of-mouth, product nurturance and product recreational activities are all manifestations of high enduring involvement (Bloch & Richins, 1983). Perceived similarity implies that the interest in the real experience decreases if people perceive it to be similar to the virtual experience and, Deng et al. (2019) found that individuals with high level of enduring involvement perceive lower levels of similarity between virtual and real experiences, thus, can distinguish aspects of virtual and real experiences suggesting that virtual and real experiences are not substitutes. Moreover, in case an individual feels satiated with a virtual experience, decreasing the interest for the actual experience, the perceived similarity only affects self-consumption, thus, people in general do not see virtual and real experiences as substitutes. Following, the negative effect of VR on real experiences will not be experienced by those who never experienced VR before. Therefore, this study proposes that individuals with high enduring involvement will perceive the VR football experience more enjoyable and useful, thus, the level of involvement with football influences perceived enjoyment (PE) and perceived usefulness (PU).

2.4.2. Avatars and Virtual Worlds

Avatar marketing is a recent and promising topic in what respects to innovation, co-creation and new experiences provided to consumers. A virtual world (VW) is defined as a 3D computer-generated world that may mimic or not the real world and offer a playful environment in which users represented by avatars can interact with each other and have such a degree of freedom to create almost anything (Kohler, Matzler, & Füller, 2009). An avatar is a customised computer-generated visual representation of a user (Jin & Bolebruch, 2009) that allows the self to be seen and interact with others in a virtual world (Kohler, Fueller, Stieger, & Matzler, 2011).

VW such as Second Life have been proving to be optimal for innovation mainly due to the consumer-company immediate and media-rich interactions that are so dynamic, consequently increasing telepresence (Suh & Lee, 2005) and to the wide range of options provided by companies for consumers to freely explore and create anything they want and share it with others (Kohler et al., 2011). Moreover, companies only develop the environment because users create their own experiences within it and, intrinsically enjoying and engaging experiences, defined as compelling experiences, are those which users seek to repeat and allow users to perform at "peak levels" reaching to superior levels of thought which are decisive in the co-creation process (Kohler et al., 2011)

Besides the enormous innovation potential, avatars and virtual worlds surpass traditional offline testing methods since they allow a "real-time, two-way and low-cost communication" and a quicker, inexpensive, more confidential and sometimes more direct way of testing new product concepts (Kohler et al., 2009) that allow companies to better understand consumers since the true-self is more likely to be activated in online environments than in real environments where some people retract (Bargh, McKenna, & Fitzsimons, 2002). Moreover, Martínez-Navarro, Bigné, Guixeres, Alcañiz and Torrecilla (2019) state that when experiencing telepresence in a virtual environment individuals behave and interact similar to real-life spontaneous and unconsciously. In addition, Kohler et al. (2009) states that "many people take considerable pride in their creations as public expression of hidden aspects of their identities".

A new trend called 'reverse product placement' is emerging alongside virtual worlds and refers to creating an imaginary brand or concept in a virtual environment with the purpose of testing it in the real world, which is the opposite of traditional product placement (Kohler

et al., 2009). The active participation of consumers in the creation process not only generates higher familiarity with the product/service that may lead to attachment resulting in higher levels of involvement (Kohler et al., 2011), but consumers also learn more and provide better feedback on the product/service (Kohler et al., 2009). The main objective of co-creation is to develop more customer-focused offers in the real environment, thus, avatars represent a marketing research tool to study consumers behaviours and then use the data to improve both real and virtual experiences (Kohler et al., 2011).

Holsapple and Wu (2007) found that interactions and communication through voice among users of a virtual world have a positive effect on the acceptance of a virtual world. Therefore, for the purpose of this study a new factor named 'Social Interactions' will be included in the proposed TAM. It comprises communication and collaboration within the virtual experience as antecedents of the PU and PE.

2.5. Technology Acceptance Model (TAM): Adaptation to VR applied to football

2.5.1. TAM background

The first version of TAM created in 1986 was developed to explain the determinants of people's acceptance of a broad range of technologies by examining their beliefs of PU and perceived ease of use (PEOU), the factors of attitude towards the technology (Davis, Bagozzi, & Warshaw, 1989). Adaptability is the main advantage of this model allowing one to apply it in several contexts making it a good starting point to researches on several technologies (Rynarzewska, 2018). However, the original version does not fully capture key aspects that influence attitude towards technology use and purchase intention, thus, Manis and Choi (2019) proposed an updated version applied to VR that integrates four new variables, namely, age, curiosity, past use and price willing to pay in the revised version of TAM in which PE was included as a third belief due to "feelings of self-efficacy, competence and self-determination" which influence intrinsic motivation to use a technology (Davis, Bagozzi, & Warshaw, 1992). One may have several beliefs regarding something but only a few are determinants of one's attitude towards it and the beliefs proposed for this revised version of TAM are PEOU that would affect both one's PE "apart from any performance consequences that may be anticipated" and PU (Rynarzewska, 2018), defined as the extent to which one believes that adopting a certain technology would be

beneficial (Manis & Choi, 2019). These two would in turn affect the purchase intention and attitude towards purchasing a VR device and the attitudes towards using it. However, Sun and Zhang (2006) found that as one becomes used to a technology by experiencing it, the effect of PEOU on PU vanishes overtime. Despite of Sun and Zhang (2006) have found in 47 studies of TAM that PEOU had an effect on PU, the present study does not agree on this since younger generations increasingly adopt technology earlier and earlier thus these technology-savvy generations easily learn and adapt to a new technology and studies prior to 2006 may not be reflexive of today's reality. Therefore, the present study proposes that PEOU only influences positively PE by arguing that an individual enjoys more an experience that is easy to access, clear and does not require much effort and time to learn and to understand how to experience it. The TAM version proposed by Davis et. Al (1989) states that attitude is directly related with behaviour because people intend to perform behaviours toward which they have a positive attitude. Most previous researches applied TAM to technologies that mainly offered utilitarian benefits, however VR offers not only utilitarian but mostly hedonic benefits. Although, attitudes are not immediately connected to behaviours since consumers may not find a VR device very useful but to have a positive attitude towards it due to its hedonic benefits (eg: gaming), an attitude may lead to a behaviour (Manis & Choi, 2019). Regarding the four new variables, Manis and Choi (2019) applied TAM to VR and found that age negatively influences PEOU; past use positively affects PEOU and use intention; interest curiosity has a positive effect on PEOU and; willingness to pay positively influences PEOU and PE.

2.5.2. Proposed version of TAM applied to a VR football experience

Although Manis and Choi (2019) support that age negatively influences PEOU and has no effect on PU, Chung, Park, Wang, Fulk, and Mclaughlin (2010) have found that older users comparing to younger had lower self-efficacy, thus, less technology-savvy, but there was no effect from age on factors leading to technology adoption. Moreover, Sun and Zhang (2006) state that younger users give more importance to the extrinsic reward, converted into PU, while PEOU is a stronger predictor of behaviour for older users. Despite of the findings of several TAM studies not being conclusive when it comes to age (Manis & Choi, 2019), the present study proposes that age negatively influences PEOU and PU. Thompson, Higgins and Howell (1994) support that having been exposed or used a certain technology (past use),

positively affects the future usage of that technology and, Kim and Malhotra (2005) supports that past use positively influences both PEOU and PU. Moreover, users of a technology who experienced it before use prior experiences to form their behaviour intention which consequently affects usage and, as a user gains experience overtime, the effect of PEOU on PU and behaviour vanishes (Sun & Zhang, 2006). In agreement, the present study considers the positive influence of past use on PU, PEOU and on use intention and the inexistence of an effect of PEOU on PU as just mentioned. However, there is still a disagreement on the effect of past use (Manis & Choi, 2019). Regarding curiosity, Litman (2008) states that there are two types of curiosity, interest and deprivation curiosity. The former is defined as one's interest in acquiring new ideas and concepts and, involves feelings of pleasure associated with intellectual mastery. The latter involved spending time and efforts on learning and exploring something purely performance-oriented with the objective of reducing uncertainty. Looking at the VR football experience proposed, its hedonic benefits surpass utilitarian, therefore, it is expected that interest curiosity about the experience and, a high interest in learning something through exploration while experiencing feelings of pleasure might lead to higher adaptation to the technology, thus, higher PEOU, in accordance with Manis and Choi (2019) hypothesised. Manis and Choi (2019) have found that price willing to pay positively affects PEOU and PE and has no effect on PU. In addition, "price should be a dominant cue for consumers attempting to evaluate usefulness, ease of use, and enjoyment prior to purchase" (Manis & Choi, 2019). On the other hand, Liao, Tsou and Shu (2008) state that one's expectation of price fairness is linked to perceived product quality, performance and consumer satisfaction. Therefore, if an individual's perceptions of quality and performance of a product/service exceed his/her expectations, it will lead to a favourable attitude towards accepting the price (Liao et al., 2008). In accordance to the information just mentioned and to the economic concept of 'utility', this study proposes that, PU as utilitarian-related component of the utility got from the product/service, PE as hedonic-related component and, PEOU which comprises both utilitarian and hedonic benefits may positively influence attitude towards price.

Sun and Zhang (2006) include subjective norms (SN) as factor leading to adoption and it is defined as "a person's perception that most people who are important to him think he should or should not perform the behaviour in question". SN can influence an individual through compliance (SN-Behaviour intention (BI)) or through internalisation and identification (SN-PU), however, only a few studies found significant SN-BI relationship since this relationship

is significant in mandatory contexts (Sun & Zhang, 2006). Since an individual is in a voluntary context when deciding whether to use/purchase or not a VR equipment, the present study proposes that there is no SN-BI relationship. On the other hand, the present study agrees on the SN-PU relationship since the arrival of the digital age, that paved way for influencers and opinions leaders and, allowed easier and higher level of connection among individuals. One might think that if people who are important for him/her use a certain technology it might be useful. In the context of virtual worlds, Holsapple and Wu (2007) also found a significant SN-PU relationship and ignored SN-BI relationship. As discussed on 'Sports Consumption and Fan Evolution' chapter, information consumption is important to satisfy football fans need to socialise by providing subject of conversation, therefore, it is proposed that an experience that enhances this act may influence PU and PE. Following discussion on 'VR Applications and Consumer Experiences' chapter, it is proposed that individuals with high enduring involvement will perceive the VR football experience more enjoyable and useful, thus, the type of involvement influences PU and PE. In addition, a social interactions factor including communication and collaboration among the users of the VR football experience was proposed as an addition to the new TAM version. Finally, Sun and Zhang (2006) also suggests that there are three main differences between males and females adoption of technology. Males are more pragmatic and task-oriented than females while women experience higher technology-anxiety, lower self-efficacy and are more likely to be influenced due to greater awareness of others' feelings comparing to men. This suggests that males give more importance to PU whereas females find PEOU more important.

2.5.3. Hypotheses

Considering the review of the literature, the following hypotheses are considered: Attitude towards purchasing VR equipment positively influences purchasing intention (**H1**); Attitude towards using VR equipment positively influences use intention (**H2**); PEOU positively influences PE (**H3**), attitude towards price (**H4**), attitude towards purchasing VR equipment and experience (**H5**) and, attitude towards using VR equipment (**H6**); PE positively influences purchase intention (**H7**), attitude towards purchasing VR equipment (**H8**), attitude towards using VR equipment (**H9**), attitude towards price (**H10**) and, PU (**H11**); PU positively influences purchase intention (**H12**) attitude towards price (**H13**), attitude towards

purchasing VR equipment (**H14**) and, attitude towards using VR equipment (**H15**); Age has a negative effect on PEOU (**H16**) and on PU (**H17**); Past use positively influences PU (**H18**), PEOU (**H19**) and use intention (**H20**); Interest curiosity positively influences PEOU (**H21**); SN have a positive effect on PU (**H22**); Information consumption positively affects PU (**H23**) and PE (**H24**); Individuals highly involved present higher levels of PU (**H25**) and PE (**H26**); Social interactions with other users positively influences PU (**H27**) and PE (**H28**); Gender significantly influences PU (**H29**) and PEOU (**H30**). These hypotheses are organised in Figure 2 for a better understanding of the model.

Figure 2 – Proposed acceptance model.

3. Methodology

3.1. Concept

The VR football experience proposed in this study is an immersive experience similar to the real experience of attending the stadium in a matchday. In this experience each user is represented by an avatar and through a VR HMD with haptic devices, one can meet with friends and other fans in the surroundings of the stadium or in lounges inside like in a real matchday. Club's staff are also part of the experience, represented by avatars as well, and users can interact with them.

Users can also access pre-match moments and feel the ambience in the locker room (excluding match preparation matters) or even the anxiety of the players waiting in the tunnel and experience entering in the pitch like a football player. Users can communicate through voice and interact with other users in the experience and to virtually react to the different moments of the match like shout, applaud, chant contributing to a stadium ambience like in the real experience at the stadium. Moreover, users can watch the game through different angles, choosing to be seated closer to the goals, in a more sided position, take the presidential point of view or even watch the game from the bench taking coach's perspective. Users can occupy a virtual cabin if they are looking for a more private area to watch the game with their friends. When watching the highlights users can take a player's point of view to better understand plays and intentions, from the striker to the goalkeeper or any other player in the pitch. Furthermore, users will also get access to live information, statistics and content that pop-up during the match. At the end of the match users can get access to post-match content like flash interviews and at the end of the match users are invited to visit club's virtual store where they can walk around like in the real store and order items that are further delivered at home.

Images in appendix 1 help to better understand the experience through images that illustrate the description above.

3.2. Pre-test and Data Collection

To pre-test the research instrument the researcher appealed to eight acquaintances to respond to the survey until the end, some have experience on academic research and/or had already been enrolled in research courses during their programs. Then, in form of an unstructured

interview they were asked about each question in terms of wording, understanding of the concept being tested, organisation of the questions and length and duration of the survey. Following respondents' recommendations, some dubious or more complex items were deleted and the wording of some items was optimised for better understanding of the items. Moreover, images were placed in a different way and images description were changed to optimise the survey for mobile. After changes are made, the average response time decreased to eight minutes, which is considered a reasonable duration for a survey.

Quantitative research was made by means of an online survey which was conducted to collect primary data due to the flexible, fast and cost-effective data collection and high availability of respondents through this method that may result in a high response rate (Saunders, Lewis, & Thornhill, 2009). Moreover, "internet users do not differ from the total population in terms of sexual orientation, marital status, ethnicity, education and religion, they do in terms of age and gender" (Saunders et al., 2009). The sampling technique used was self-selection sampling, a non-probability type of sampling (Saunders et al., 2009). The survey was distributed through several football-related social media groups inviting group members to respond. The main purpose of this survey is to test the statistical significance of the theorised model using a relevant segment, Portuguese football fans.

The survey comprised eight main sections. First, it started with a brief presentation explaining the purpose and scope of the survey. Second section included screening and introductory questions regarding the role of the respondent in the football industry and knowledge about VR. Then, respondents were exposed to the concept. The following four sections contained respondents' past use, perceptions, dynamics, attitudes and intentions, respectively. Finally, the last section was about respondents' demographic information. Considering respondents were supposed to be Portuguese, survey questionnaire was launched in Portuguese and this, alongside with its English version, can be found in appendix.

Data was collected between October 31st and November 16th and in total, 229 surveys were started and only 203 completed surveys were considered valid either because excluded respondents did not like and consumed football or due to uncompleted surveys.

3.3. Constructs

Table 1 contains all the constructs used and respective sources. Most of the constructs were measured using items from previous TAM researches and adapted to the context of the present research. In most of the constructs a seven-point Likert-scale was used to answer to the statements and to measure attitudes seven-point semantic differential scales were used. In both, seven points scales were used for the sake of the balance of the scale to obtain objective data. By using an odd number of categories, it allows the researcher to force response, thus, respondents must select an option even if they have no opinion, case in which they select the neutral (central) position of the scale. Regarding the attitude towards price, the price of 250€ was presented and respondents selected on a seven-point semantic scale how reasonable the price was. In terms of the past use, it was asked through a five-point likert scale with five different levels of experience with VR devices.

Construct	Measurement Indicators		Sources
Perceived Usefulness	PU1	Using VR equipment for the experience proposed would be useful for me.	Adapted from: Holsapple and Wu (2007); Manis and Choi (2019); Rynarzewska (2018); Own
	PU2	Using VR equipment would make my football watching experience more productive.	
	PU3	Using the VR equipment for the football experience proposed would allow me to get access to an experience similar to a real matchday.	
Perceived Ease of Use	PEOU1	I believe it would be easy to operate the VR equipment.	Adapted from: Holsapple and Wu (2007); Lee, Kim and Choi (2019); Manis and Choi (2019); Own
	PEOU2	I would easily become skilful at using the VR equipment.	
	PEOU3	I think it would be easy to find in the experience the information and content I like.	
	PEOU4	It would be easy to interact with other users of the experience through the VR equipment.	
Perceived Enjoyment	PE1	I believe I would have fun using VR equipment.	Adapted from: Lee et al. (2019); Liao, Tsou and Shu, (2008); Manis and Choi (2019); Own
	PE2	Using the VR equipment would be a good way to spend my leisure time.	
	PE3	The experience would be entertaining.	
	PE4	Overall, I find interesting the features and aspects of the VR experience proposed.	
Interest Curiosity	Cur1	In general, I like to watch football games even if my favourite teams are not playing.	Adapted from: Liao, Tsou and Shu, (2008); Own
	Cur2	I am interested in learning about football.	
	Cur3	I like to search for football related information and content just out of curiosity.	
Subjective Norms	SN1	I believe my friends would be useful for the VR experience proposed.	Adapted from: Holsapple and Wu (2007); Own
	SN2	I believe my friends would be helpful using the VR equipment.	
	SN3	If my friends purchase the VR equipment, it is very likely that I will also purchase it.	
	SN4	I believe clubs and federations should support the usage of the VR equipment.	
Involvement	Involv1	I actively search for football information and content.	Adapted from: Wann, D. L. et al. (1996); Own
	Involv2	I feel excited or anxious when I am watching my favourite teams.	
	Involv3	I watch every game of my favourite(s) team(s) either on TV or in the stadium.	
	Involv4	I usually speak about football with others (eg: friends, family, acquaintances).	
Social Interactions	SI1	I find interesting that the experience allows me to communicate with other fans through voice.	Adapted from: Holsapple and Wu

	SI2	I find interesting that the experience allows me to interact with other fans.	(2007); Lee et al. (2019)
	SI3	I find interesting that the proposed experience allows me to collaborate with other fans in the virtual environment to create the stadium's ambience.	
Information Consumption	IC1	I like to receive live updates related about my favourite teams.	Adapted from: Rynarzewska (2018); Own
	IC2	I am constantly seeking information and content about football.	
	IC3	I seek football information and content while I am watching a match.	
	IC4	I seek football information when I am in my leisure time.	
Attitude Towards Purchasing VR Equipment To Get Access To The Experience Proposed	AP1	Negative-Positive	Adapted from: Manis and Choi (2019)
	AP2	Unsatisfactory-Satisfactory	
	AP3	Unfavourable-Favourable	
Attitude Towards Using VR Equipment To Get Access To The Experience Proposed	AU1	Negative-Positive	Adapted from: Manis and Choi (2019); Own
	AU2	Unsatisfactory-Satisfactory	
	AU3	Unfavourable-Favourable	
	AU4	Uncomfortable-Comfortable	
	AU5	Boring-Exciting	
	AU6	Inferior (to Traditional TV experience)-Superior	
	AU7	Dissuades me-Motivates me (to watch more football)	
Purchase Intention	PI1	I intend to purchase VR equipment in the foreseeable future.	Adapted from: Lee, Fiore and Kim (2006); Manis and Choi (2019); Own
	PI2	It is likely that I will purchase a VR device in the foreseeable future.	
	PI3	Purchasing VR equipment in the future is important to me.	
	PI4	I would be willing to recommend to my friends the VR equipment presented.	
	PI5	If my favourite teams offer the experience it is likely that I will purchase the equipment.	
Use Intention	UI1	I intend to use VR equipment in the foreseeable future.	Adapted from: Manis and Choi (2019); Own
	UI2	It is likely that I will use a VR device in the foreseeable future.	
	UI3	Using VR equipment in the future is important to me.	
	UI4	If my favourite teams offer the experience it is likely that I will use the equipment.	

Table 1 – Constructs and measurement indicators.

4. Results and Analysis

4.1. Sample characteristics and data analysis

The distribution of participants according to demographic variables can be found in Table 2. Regarding respondents' role in the football industry, around 47,8% referred they are just occasional football fans while 50,7% of the respondents are active football fans. Moreover, 20,7% played football either at amateur or professional level. Around 3,5% of the respondents are employees at a football club. Despite of watching on average 74,7% of the matches at home, respondents sometimes watch games alone and when watching football matches at home, 87,2% mentioned they prefer to do it accompanied. The current TV experience of watching football matches moderately satisfies fans (4,35 out of 7 points). In terms of familiarisation with VR, respondents are moderately familiarised (4,44 out of 7 points).

Age	Gender	Education	Income
<24: 37,4%	Male: 61,1%	High School: 15,8%	<500€: 21,2%
25-34: 34,5%	Female: 38,9%	Technical Course: 5,4%	500€-999€: 16,3%
35-44: 23,2%		Bachelor: 55,7%	1000€-1999€: 45,3%
>45: 4,9%		Master: 23,2%	2000€-2999€: 13,8%
			3000€-4500€: 2,0%
			>4500€: 1,0%

Table 2 – Sample demographics.

Data was analysed using Structural Equation Modelling (SEM) which is a second-generation multivariate method that enables researchers to include unobserved variables indirectly represented by indicators, thus, making it a suitable method for social and marketing sciences (Hair, Hult, Ringle, & Sarstedt, 2013). Ken Kwong-Kay Wong (2013) also supports this by stating that the fact that SEM analyses unobservable and hard-to-measure variables makes it suitable for business research problems, strategy and marketing problems (Henseler, Hubona, & Ray, 2016).

There are several approaches to SEM and the present research used the Partial Least Squares (PLS) approach which has no assumptions about data distribution and is appropriate when

the sample size is small, applications have little available theory, predictive accuracy is paramount and correct model specification cannot be ensured (Ken Kwong-Kay Wong, 2013). PLS was found the most appropriate approach because of the relatively small sample size considering football is a national phenomenon and the expected unbalance among age groups due to the sampling methods and unbalance between genders considering the profile of football fans. The lack of literature combining VR and sports, more specifically football, also contributed to the choice of PLS approach.

A PLS-SEM is composed by the measurement model, which displays the relationships between each construct and its indicators, and the structural model which displays the relationships between constructs which can be endogenous if explained by other constructs in the model or exogenous if do not (Hair et al., 2013). To run a PLS analysis, the SmartPLS software, which is one of the most commonly used, was used due to its user-friendliness interface and advanced reporting (Ken Kwong-Kay Wong, 2013).

Relationships between indicators and constructs were defined as reflective since causality goes from the construct to indicators because indicators are manifestations of the construct, are interchangeable and any indicator can be excluded without compromising the construct (Hair et al., 2013).

4.2. Measurement model validation

The assessment of reflective measurement models includes composite reliability and Cronbach's Alpha to evaluate internal consistency, individual indicator reliability, average variance extracted (AVE) to evaluate convergent validity and Fornell-Larcker, Cross-loadings (Hair et al., 2013) and/or HTMT to assess discriminant validity (Henseler, Ringle, & Sarstedt, 2014). Table 3 includes indicators' loadings, means and standard deviations and, internal consistency and convergent validity measures.

Internal consistency was evaluated based on the composite reliability (CR) values which are all above the recommended 0,7 (Hair et al., 2013; Ken Kwong-Kay Wong, 2013) and on the Cronbach's Alpha values which are also above the suggested threshold of 0,7 (Henseler et al., 2016). Despite of CR being recognised as a more appropriate measure for internal consistency due to Cronbach's Alpha limitations, both measures suggest acceptable levels of internal consistency (Martínez-Navarro et al., 2019).

In terms of indicator reliability, most of the items have loadings above 0,7 suggesting they are significant (Ken Kwong-Kay Wong, 2013), except for Involv1 and AU5. However, both items not only present values close to the suggested threshold but also exceed the 0,5 recommended (Bagozzi & Yi, 1988) for high individual item reliability, suggesting that items are reliable indicators of their constructs.

Convergent validity is defined as the degree of positive correlation of an indicator with other indicators of the same construct, thus, indicators of a specific construct should share a high proportion of variance (Hair et al., 2013). Average variance extracted (AVE) criteria is used to establish convergent validity and it represents the sum of the squared loadings divided by the number of indicators, thus an AVE greater than 0,5 is acceptable (Bagozzi & Yi, 1988) meaning "the construct explains more than half of the variance of its indicators" (Hair et al., 2013). AVE values for all the constructs are above 0,5 thus confirming convergent validity.

Discriminant validity is the extent to which a construct is distinct from other constructs in the model (Hair et al., 2013). Fornell-Larcker is the most common criteria to evaluate discriminant validity, but due to its inefficiencies it was decided to use HTMT, the most recent criterion proposed by Henseler, Ringle and Sarstedt (2014) that comes as a more informative alternative. It is known that variance-based SEM methods such as the Partial Least Squares (PLS) tend to overestimate indicator loadings, thus the degree of overlap between each indicator will be high, especially if the number of indicators per construct is small (Henseler et al., 2014). Moreover, Fornell-Larcker is a very conservative criterion (Hair et al., 2013) and does not rely on inference statistics and, cross-loadings approach only works well if there is a high degree of heterogeneity among loadings and high sample sizes (Henseler et al., 2014). For TAM studies in which despite of constructs being conceptually different, they may be difficult to distinguish empirically, therefore, this study uses HTMT.90 criterion which is between HTMT.85 (most conservative) and HTMT_inference (most liberal) in terms of conservatism (Henseler et al., 2014).

Looking at the HTMT.90 table, most of the values are below the recommended 0,9 (Henseler et al., 2014) except for the pairs PU-AP, IC-Curiosity, UI-PI, SN-SI, Involv-IC, and SN-PE, which present values close to 0,91 except the last two pairs. It is reasonable that an individual who consumes a lot of information about football also is very curious about it. Similarly, an individual who is highly involved in football will also consume more information about it. In the same manner, if an individual perceives the VR equipment to be useful and to improve

his football watching experience it is expected that his/her attitude towards purchasing the equipment will be positive or that if one intends to purchase an equipment it is likely that he/she wants intends to use it. Moreover, Henseler et al. (2014) state that discriminant validity is not exclusive to validate a model since theory and arguments should support the existence or lack of correlations between constructs and, fail to confirm discriminant validity does not mean the constructs are conceptually similar (Bagozzi & Phillips, 1982). Overall, there is an acceptable level of discriminant validity in this model.

Constructs	Measurement Indicators	Factor Loading	Mean	Standard Deviation	AVE	Composite Reliability	Cronbach's Alpha
Perceived Usefulness	PU1	0,891	4,69	1,468	0,703	0,876	0,874
	PU2	0,845	5,17	1,581			
	PU5	0,776	4,92	1,433			
Perceived Ease of Use	PEOU2	0,839	5,05	1,532	0,683	0,896	0,895
	PEOU3	0,838	4,05	1,811			
	PEOU4	0,824	4,50	1,252			
	PEOU5	0,802	4,83	1,199			
Perceived Enjoyment	PE1	0,844	5,13	1,419	0,770	0,930	0,930
	PE2	0,893	5,73	1,214			
	PE3	0,828	4,55	1,617			
	PE4	0,940	5,32	1,375			
Curiosity	Cur1	0,745	3,97	1,803	0,732	0,891	0,890
	Cur2	0,885	4,37	2,131			
	Cur3	0,927	4,38	1,725			
Subjective Norms	SN1	0,860	5,24	1,413	0,679	0,894	0,895
	SN2	0,767	4,85	1,539			
	SN3	0,797	4,76	1,631			
	SN4	0,868	5,19	1,556			
Involvement	Involv3	0,913	4,07	1,861	0,736	0,917	0,919
	Involv4	0,892	5,61	1,351			
	Involv5	0,806	4,94	1,892			
	Involv6	0,814	4,79	1,798			
Social Interactions	SI1	0,792	5,19	1,281	0,672	0,860	0,858
	SI2	0,882	4,95	1,429			
	SI3	0,782	5,33	1,406			
Information Consumption	IC1	0,850	4,61	1,533	0,592	0,852	0,855
	IC2	0,725	4,06	1,863			
	IC4	0,761	3,24	1,661			
	IC5	0,734	4,26	1,842			
Attitude towards purchasing	AP1	0,941	4,91	1,478	0,858	0,948	0,947
	AP2	0,941	5,03	1,533			
	AP3	0,896	4,49	1,571			
Attitude towards using	AU1	0,906	5,18	1,545	0,724	0,948	0,947
	AU2	0,946	5,56	1,386			
	AU3	0,898	4,76	1,464			
	AU4	0,847	5,58	1,218			
	AU5	0,676	3,90	1,612			
	AU6	0,846	5,56	1,148			
	AU7	0,810	5,29	1,163			
Purchase Intention	PI1	0,879	4,55	1,755	0,754	0,939	0,939
	PI2	0,815	4,14	1,746			
	PI3	0,836	3,25	1,723			
	PI4	0,938	4,43	1,619			
	PI5	0,869	4,90	1,703			
Using Intention	UI1	0,888	5,10	1,780	0,823	0,949	0,949
	UI2	0,966	4,71	1,840			
	UI3	0,943	3,73	1,766			
	UI4	0,825	5,16	1,660			

Table 3 – Measurement model validation results.

4.3. Evaluation of structural model

The assessment of a PLS-SEM is based on heuristic criteria determined by the model's predictive capabilities that do not allow for global goodness of fit testing as in CB-SEM, thus, "the model is assumed to be specified correctly and is assessed in terms of how well it predicts the constructs" (Hair et al., 2013). The key criteria to assess PLS-SEM are the size and significance of path coefficients, coefficients of determination (R^2), predictive relevance (Q^2), and effect sizes, f^2 and q^2.

The results of the estimation of the structural model are showed on Table 4. Significance levels and t-values were obtained through bootstrapping procedure confirming most hypothesis except for H5, H7, H10, H16, H17, H18, H23, H26, H29 and H30. Standardized path coefficients usually range from -1 to 1 and looking at Table 4 it is possible to identify multicollinearity in involvement and information consumption linkages since these values exceed the |1| (Hair et al., 2013).

As a measure of model's predictive accuracy, R^2 is the most common used measure to evaluate the structural part of the model and it represents the amount of variance in the endogenous which is explained by exogenous latent variables linked to it (Hair et al., 2013). To avoid bias towards complex models, adjusted R^2 values were considered and, following the criterion suggested by Hair et al. (2013), AP, AU, PE, PI and PU have substantial R^2 values (>0,75), PEOU and UI have moderate R^2 values (>0,50) and AttitudePrice has a weak R^2 value of 0,298. Moreover, p-values of all the adjusted R^2 are equal to zero which means that all the relations are statistically significant. In addition to R^2, the model's f^2 effect size was also used to assess the contribution of exogenous latent variables on endogenous latent variables' R^2 (Ken Kwong-Kay Wong, 2013). Following the recommended values of 0,02, 0,15 and 0,35 for small, medium and large effect sizes, respectively (Hair et al., 2013), PEOU has small effect sizes (weak relationship) on attitudes and medium on PE. Moreover, gender has also small effect sizes on both PEOU and PU which confirms the lack of significance of these two paths. Although SN has a significant positive influence on PU, it has a small effect size on PU which is supported by the small path coefficient. All the other f^2 values are either medium or large effect sizes, suggesting the model has acceptable f^2 values.

To assess model's predictive relevance Q^2 values were obtained using the blindfolding procedure (D=6) which is a "sample reuse technique that omits every dth data point in the endogenous construct's indicators and estimates the parameters with the remaining data

points" (Hair et al., 2013). Following the criterion suggested by Hair et al. (2013), all Q^2 values are above the recommended value of zero and all represent a large level of predictive relevance (Ken Kwong-Kay Wong, 2013), therefore, the model has large predictive relevance for all the endogenous latent variables.

Hypothesis	Standardized Path Coefficients	t-Value	Result
H1: Attitude Purchase → Purchase Intention	0,372 ***	4,672	Accepted
H2: Attitude Use → Use intention	0,645 ***	10,230	Accepted
H3: PEOU → PE	0,101 ***	4,185	Accepted
H4: PEOU → Attitude towards price	0,153 *	2,499	Accepted
H5: PEOU → Attitude Purchase	-0,053	0,708	Rejected
H6: PEOU → Attitude Use	0,072 *	2,409	Accepted
H7: PE → Purchase Intention	-0,299	0,830	Rejected
H8: PE → Attitude Purchase	0,151 ***	3,429	Accepted
H9: PE → Attitude Use	0,342 ***	6,002	Accepted
H10: PE → Attitude towards price	-0,321	0,754	Rejected
H11: PE → PU	0,732 ***	5,836	Accepted
H12: PU → Purchase Intention	0,814 ***	4,067	Accepted
H13: PU → Attitude towards price	0,699 ***	4,092	Accepted
H14: PU → Attitude Purchase	0,819 ***	5,945	Accepted
H15: PU → Attitude Use	0,546 ***	5,810	Accepted
H16a: Age1 → PEOU H16b: Age2 → PEOU H16c: Age3 → PEOU H16d: Age4 → PEOU	0,044 0,162 ** -0,322 ** 0,073	0,798 2,882 4,724 0,166	Rejected
H17a: Age1 → PU H17b: Age2 → PU H17c: Age3 → PU H17d: Age4 → PU	-0,101 0,148 -0,043 -0,016	0,090 0,897 0,070 0,209	Rejected
H18: Past Use → PU	0,107	1,712	Rejected
H19: Past Use → PEOU	0,607 ***	11,607	Accepted
H20: Past Use → Use Intention	0,239 ***	4,441	Accepted
H21: Curiosity → PEOU	0,220 **	3,237	Accepted
H22: Subjective Norms → PU	0,104 *	2,437	Accepted
H23: Information Consumption → PU	-1,200	1,990	Rejected
H24: Information Consumption → PE	1,040 *	2,367	Accepted
H25: Involvement → PU	1,281 **	3,243	Accepted
H26: Involvement → PE	-1,043	2,614	Rejected
H27: Social Interactions → PU	0,185 *	2,436	Accepted
H28: Social Interactions → PE	0,679 ***	8,319	Accepted
H29: Gender → PU	0,024	1,471	Rejected
H30: Gender → PEOU	0,093	1,624	Rejected

*p-value < 0,05; **p-value < 0,01; ***p-value < 0,001

Table 4 - Results of the estimation of the structural model.

5. Discussion

The present study designs the concept of an immersive VR football experience targeted to those consumers who watch the game at home and tests the factors influencing the adoption of VR by Portuguese football consumers. This study empirically tests Portuguese football consumers perceptions about usefulness, ease of use, enjoyment and attitudes towards using and purchasing VR equipment to get access to the experience; purchase and use intentions of VR equipment; the influence of subjective norms, involvement, information consumption, social interactions, curiosity, past use, age, gender and price attitude. All these variables are incorporated in a PLS-SEM model to explain the factors leading to purchase and use intentions of football consumers who are a very particular type of consumer in terms of consumption habits and loyalty towards 'favourite products'.

Findings show that PU has a positive significant influence on purchase intention which is in accordance with previous studies (Cho & Sagynov, 2015; Liao et al., 2008; Manis & Choi, 2019). As previously described in the literature review, an attitude may lead to a behaviour and attitude towards purchasing the VR equipment has a significant positive influence on purchase intention, which is in accordance with the theory of reasoned action by Ajzen and Fishbein (Chung et al., 2010). PU has significant positive influence on attitude towards purchasing VR equipment and purchase intention, confirming that a high perceived level of usefulness of the VR equipment to access the experience and, consequently, improving one's football watching experience, leads to more positive attitudes towards purchasing the equipment and to higher intention to purchase the VR equipment to access the experience. PU emerges as the most powerful predictor of purchase intention and all the attitudes. The direct effect of PU on purchase intention is greater than the direct effect of attitude towards purchasing on purchase intention since the VR equipment might be perceived as useful for the experience of watching football (eg: to satiate the need to socialise, making the football experience at home more productive) even though the football consumers' attitude towards purchasing the VR equipment to access the experience is not that positive. Regarding use intention, it is significantly positively influenced by both attitude towards using VR equipment and past use, as expected, supporting the results of Manis and Choi (2019) and Kim and Malhotra (2005) which found that users of a technology who experienced it before use past experiences to form their usage intention. This also confirms the theory of Thompson et al. (1994) which suggests that previous exposure or usage of a certain

technology positively influences future usage. Indicators of attitude towards using vary according to the respondent's attitude except for the comfort indicator since the respondents in general find the VR equipment to be moderately uncomfortable. Both on use and purchase intentions, the possibility that respondents' favourite team(s) offered the experience was a plus suggesting that if teams offer the experience, those teams' fans will be more willing to adopt the technology.

Besides the effects of PU on attitude towards purchasing VR equipment and on purchase intention, PU also significantly positively influences attitude towards using the VR equipment, supporting previous studies (H. H. Lee, Fiore, & Kim, 2006; Liao et al., 2008; Manis & Choi, 2019; Teo & Noyes, 2011). Moreover, PU also has a significant positive effect on the attitude towards price supporting Liao et al. (2008) theory stating that if an individual's perceptions of product quality, performance and consumer satisfaction exceed his/her expectations it leads to a favourable attitude towards accepting the price. Respondents were asked about the price of €250 and it is found a moderately acceptable price (mean 4,40 out of 7). In addition, PEOU also has a positive significant effect on the attitude towards price suggesting that more an individual perceives the VR equipment is easy to use and to access the experience and, all of its features, the higher is the acceptance towards the price. Moreover, PEOU has a significant positive influence on the attitude towards using the equipment, as expected, confirming previous studies using TAM (H. H. Lee et al., 2006; Liao et al., 2008; Manis & Choi, 2019; Teo & Noyes, 2011). However, this direct effect is low which can be due to technology complexity, past use and gender that are the three main factors moderating linkages between PEOU and attitude towards use, supporting Sun and Zhang (2006). PEOU also has a significant positive effect on PE suggesting that football consumers will have more fun or enjoyment with the experience if it is easy to access, clear and does not require much effort and time to learn and understand it. The third construct of perceptions, PE, is the second most powerful predictor of attitudes with a positive influence on attitude towards purchasing and attitude towards use of the VR equipment to access the experience, suggesting that apart from performance, if a football consumer perceives high hedonic benefits from using the VR to access the experience, it leads to more favourable attitudes towards using (H. H. Lee et al., 2006; Liao et al., 2008; Manis & Choi, 2019) and purchasing the VR equipment. Bruner & Kumar (2005) also found significant positive influence of PE on the attitude but not on behaviour also confirming the original TAM author's that state PE is a fundamental construct, yet not as powerful as PU

on directly predicting intentions (Davis et al., 1992). Although not significant, PE has unexpectedly negative influence on purchase intention and attitude towards price, but looking at the indirect effects of PE on purchase intention via PU and attitude towards purchasing, they are significant (p-value=0,000) suggesting that the hedonic benefits of using the VR equipment to access the experience are necessary but not sufficient to directly increase purchase intention. PE has a significant positive effect on PU, thus, enjoyment is part of the usefulness perceived due to enjoyment's utility value to satisfy oneself. Although, PU, PEOU and PE have all significant positive effect on attitude towards using none directly influences use intention, but PE exerts the most powerful influence on use intention via attitude towards using suggesting that hedonic benefits play a fundamental role in determining use intention, whereas utilitarian benefits are fundamental to determine purchase intention as previously discussed. Furthermore, this suggests fans should actively participate in the co-creation process of the experience which may lead to greater levels of PU, PE and PEOU. According to Kohler et al. (2011), this would lead to greater familiarity and attachment with both the technology and with the experience, thus, it is beneficial for both sports organisations and fans leading to better and more customisable virtual and real experiences.

Regarding age, the effects of each age group on both PU and PEOU are not consistent with the hypothesis, thus, age has no negative significant effect on PU and PEOU, supporting Chung et al. (2010) that found older generations were less technology-savvy on average but with no significant influence of age on factors leading to technology adoption. The lack of significance may be explained with the increased levels of adaptation to technologies and their adoption by younger generations making the technology-savviness gap smaller. In terms of gender none of the linkages was statistically significant. Although not significant, being a male may lead to higher perceptions of usefulness and ease of use of the equipment to enhance football watching experience, comparing to female. This supports inconsistencies found by Sun and Zhang (2006) in several TAM studies including gender.

In terms of curiosity, it was found to have a significant positive influence on PEOU confirming the theory proposed by Litman (2008) about interest curiosity and suggesting that high interest in acquiring new knowledge, involving feelings of pleasure associated with intellectual mastery, leads to higher PEOU, confirming results from Manis and Choi (2019). Regarding SN, it was found to have a significant positive influence on PU, matching results obtained by Holsapple and Wu (2007), meaning that if an individual finds people who are

important for him/her using the VR it will lead to higher perceptions of usefulness of the equipment to enhance his/her football watching experience. Social interactions variable, including communication and interaction with others through the VR experience proposed, was found to have a significant positive influence on both PU and PE, matching results from previous studies (Holsapple & Wu, 2007; J. Lee, Kim, & Choi, 2019) and supporting that people have a necessity for frequent, pleasant and emotionally involving connections with others and fans use sports to satiate this need to socialise with others, either with unknowns who share the same fanship engagement or with relatives/friends (Theodorakis et al., 2012). This suggests that despite of the use of technology being an individual activity, this experience is social in nature. Those who value social interactions with others perceive the VR equipment to access the experience much more enjoying than useful suggesting that communicating and interacting with others has much more hedonic rather than utilitarian benefits. Moreover, involvement has a significant positive influence on PU but not on PE (significantly negative), suggesting that the Portuguese football fan who is highly involved in football (actively searches for information and content about football, feels anxiety and excitement when watching favourite teams playing, watches every games, engages in conversations about football…) perceives the VR equipment to be useful, thus, to improve the actual football watching experience. On the other hand, highly involved fans do not find enjoyable using the VR equipment to access a football VR experience similar to the real experience. This may be due to highly involved Portuguese football fans being more sceptical and old-fashioned football fans who consider that football must be watched at the stadium to experience all the ambiance and matchday events, or in person with friends either at home or at the café, contrary to what the experiences offer of being virtually with friends. It can also be explained with more frequent and closer contact of high involvement fans with the real experience or the fact they take football so seriously respecting the sport or a team like a religion. This does not go against results obtained by Deng et al. (2019) since the present study does not directly compare the VR experience proposed with the real experience of attending the stadium, but at least the present study does not support that high involved fans find enjoyable the VR experience proposed. Regarding information consumption, it has a significant positive influence on PE and a significant negative influence on PU. This suggests that fans who consume more information about football do not perceive the experience to be useful. This may be due to possible doubts regarding the type of contents included in the experience besides football matches or it can also be the case that these information consumers do not perceive the VR experience to have the type of information

and contents they believe would keep them informed like the actual TV shows and content on the internet are doing actually. Thus, when it comes to information fans who consume a lot of information about football perceive the experience to be much more hedonic-oriented rather than utilitarian-oriented, finding the experience enjoyable and an attractive way to spend their leisure time but not a good alternative in terms of information.

Finally, looking at Portuguese fans' habits, there are statistically significant differences between age group >45 and age groups <24 and 25-34 in terms of quantity of matches watched at home with the older group watching much more matches in other places rather than home. There are no statistically significant difference between age groups in terms of frequency of matches watched alone at home with older age groups presenting slightly higher descriptive statistics. Regarding satisfaction with the actual TV watching experience there are no statistically significant differences between age groups with fans showing a moderate level of overall satisfaction. In terms of familiarity with VR technology 35-44 is the least familiarized age group with statistically significant differences with younger age groups. When it comes to comparisons between genders, there are statistically significant differences with male fans being much more familiarized with VR technology (4,81 vs 3,87), slightly more satisfied with the actual TV experience (4,56 vs 4,03) and comparing to females, they watch much more matches at home alone supporting that females are more likely to actively consume sports due to their friends and family (Jacobson, 2003).

6. Conclusions, Limitations and Future Research

6.1. Conclusions and Implications

Sports fans are increasingly more engaged and want more "high value experiences both within and outside regular sport consumption" (Stavros et al., 2014), especially, a home-watching experience closer to the real experience of attending the stadium in a matchday (D. Kim & Ko, 2019) and VR is a promising technology that can revolutionise the way fans consume football.

The present study has four main theoretical contributions to the VR and sports marketing and media literature. First, it looks at which factors lead to the adoption of VR equipment to get access to a new immersive VR football experience targeted to those fans who watch the game at home. Second, this study contributes to TAM literature by extending the model considering the aspects of a very peculiar industry, football, and its consumers who are a very particular type of consumer in terms of consumption habits and loyalty towards 'favourite products'. Third, most of the studies on technology adoption focus on antecedents and/or consequences of adopting technology and do not integrate dynamics of potential users and consumers. This study empirically testes Portuguese football fans perceptions, attitudes, intentions regarding using or purchasing VR equipment to get access to the experience and dynamics of Portuguese football fans like subjective norms, information consumption, involvement, social interactions, interest curiosity, past use, age and gender. Fourth, this study researches on Portuguese football fans' match spectatorship experience and the integration of technology in football to enhance fans' football watching experience at home, an already existing consumption and the biggest source of revenue for clubs.

Use and purchase are separated dimensions in this study due to the hedonic benefits of VR equipment since an individual can have a positive attitude towards using the equipment because it is enjoyable but may not intend to purchase it because he/she does not find it very useful. In addition, attitudes are also precedents of intentions since an attitude is not directly connected to a behaviour but may lead to a behaviour (Manis & Choi, 2019). Following, findings suggest that PU is the most influential factor on purchase intention and on attitudes towards purchasing, using and price of the equipment showing the value Portuguese football fans place on the utilitarian benefits of the VR equipment to improve and make more productive their football watching experience. The most influential antecedents of PU are

the involvement with football, meaning highly involved fans perceive higher utilitarian benefits from the VR equipment and experience, and PE which is the second most influential factor on attitudes towards using and purchasing. PE does not lead directly to intentions, but it is strongly linked to PU showing that enjoying the experience is a fundamental aspect of the usefulness of the VR equipment. In addition, PE is strongly influenced by information consumption and social interactions with other users of the experience. Regarding use intention, it is strongly predicted by the attitude towards using which has PU and PE has its most influential factors. However, due to fans' dynamics, PE has a higher effect on use intention comparing to PU. Therefore, hedonic benefits play a fundamental role in determining use intention, whereas utilitarian benefits are fundamental to determine purchase intention. Moreover, those who have already experienced a VR equipment are keener to use the equipment to get access to the experience and to have higher PEOU. In addition, curiosity about football also leads to higher PEOU, which consequently leads to higher perceptions of hedonic benefits since people enjoy more something they do not have to spend much time and effort learning about it. However, PEOU has weak linkages with attitudes.

The present study recommends sports organisations to embrace VR technology to provide new types of contents and to renew their main revenue source, broadcasting, providing fans with a different and more immersive football watching experience at home. The introduction of this technology will allow sports organisations to extend the existing markets by providing fans who already attend the stadium or who watch matches at home an innovative and immersive way to attend matchday and access contents beyond the match itself. Most of the fans cannot experience their favourite team's matchday at the stadium mainly due to geographic and economic reasons and, this technology would offer them an immersive and relatively cheaper experience comparing to season pass or even match tickets prices on top of logistic costs. It also allows sports organisations to attract new markets such as those who usually do not consume football but find the experience enjoyable and/or useful to satiate their social needs or simply to establish contact with foreign potential fans who live in countries where an experience of this type is not offered or countries where sports are underdeveloped. Different strategies should be developed to attract different types of fans. Highly involved fans perceive the equipment and experience to be very useful and consequently have higher purchase intentions and more favourable attitudes towards price and purchasing comparing to less involved fans. Moreover, high involvement fans do not

perceive the experience to be enjoyable which is contrary to less involved fans, that place greater importance on perceived hedonic benefits and the equipment seems useful if the experience gives them feelings of pleasure and enjoyment. In addition, sports organisations should also design a user-friendly experience because despite of being somewhat a weak effect, fans find the experience more enjoying if both the equipment and the experience are easy to use. Thus, in accordance with the values obtained for indirect effects, for less involved fans, purchase intention and attitude towards purchase are indirectly linked to higher perceptions of enjoyment. In addition, highly involved fans showed a much more positive attitude towards price comparing to low involvement fans. Therefore, marketers should focus on utilitarian benefits when targeting high involvement fans whereas hedonic benefits should be emphasized when targeting low involvement fans. Moreover, heavy consumers of information about football may have some doubts regarding the type of contents included in the experience besides football matches or do not perceive the experience to have the type of information and contents they believe would keep them informed like the actual TV shows and content on the internet are doing actually. Thus, when targeting heavy consumers of information about football, sports organisations should emphasize the usefulness of the equipment to access the experience and simultaneously improve the concept proposed to ensure it delivers valuable information.

Considering that biggest teams' stadium is close to full capacity in matchdays, the introduction of this technology-generated experience should not represent a threat to matchday revenues but an opportunity to increase clubs' biggest revenue source, broadcasting. Cannibalisation within broadcasting may occur but only in the homes segment since the traditional TV experience is more appropriate for cafés, restaurants and other places where fans usually watch football. Furthermore, this experience should not only be seen as an improved customer experience. Sports organisations should look at this as an avatar marketing tool from which they can leverage and deliver a compelling and customisable experience, fundamental for the co-creation process and, allowing organisations to get deeper insights from fans. Although this study provides managers with valuable information to consider whether to embrace VR, which has the potential to impact both football industry and society as a whole, managers should consider both pros and cons of introducing this experience due to investment costs and because it might not work for clubs with smaller dimension.

6.2. Limitations and Future Research

Despite of contributions to literature on TAM, VR and sports marketing, this study has some limitations that suggest further research.

First, gender and age effects on PU and PEOU were inconsistent, thus, they were not possible to confirm which can be due to discrepancies in the balance between males and females, which was already expected in the football context, and to the lack of older respondents which may be due to the method used in the distribution of the survey since younger generations are more active users of social media.

Second, the sampling method was non-probability sampling and the sample size could be higher considering football is a national phenomenon. Notwithstanding, survey respondents are all football fans which is the relevant segment to test this concept. The relevancy of the sample made possible to obtain statistically significant results even with a relatively small sample size (comparing to the number of Portuguese football fans) suggesting strong and applicable findings. Third, football fanship in Portugal does not have much variety with around 95% of the fans supporting the three biggest teams in the country (Observador, 2019), thus, a very small number of other clubs' supporters might be included but not representative of them which makes the experience tested in this study only viable to bigger teams. The sampling method used alongside with sample size and the fanship in Portugal limit the generalisation of the findings for all the Portuguese clubs.

Fourth, the present study assumes the technology-generated experience proposed is an innovation of the traditional TV experience at home, but it does not address cannibalisation issues regarding the real experience of attending the stadium. Therefore, further research should be conducted to assess the effect of a VR football experience similar to a real matchday on the desire for the real experience.

The present study assesses factors leading to football fans' adoption of the VR equipment to access the experience, but it does not consider that adopting VR may lead to an individual's identification with a certain sport or team. It can be the case that a person who is not involved in football becomes fan of football of fan of a particular team because this sport or team offer a useful and enjoying experience. Therefore, future research should be conducted to assess the influence of VR on sport and team identification by potential football fans. Moreover, further research should also be conducted to assess the effect of the proposed technology-generated experience on the brand (club) image.

Another limitation is that the present study considers only the price of the VR hardware which is the mean to an end (the experience) but it does not consider how the VR experience will be priced and how much will it cost for the consumers. Further research should be conducted to determine both the best way to price the experience considering clubs and federations and the most convenient way for consumers.

Furthermore, the present study assumes the experience is accessed through a HMD with haptic devices but it could also be the case that the experience can be delivered through more traditional hardware like computers or even using mobile. Further research should be conducted to determine the most appropriate device to deliver the proposed experience, considering different levels of immersion provided by different devices and fans' preferences over different types of devices. Alongside with this, the present study does not consider the fact that a football match lasts at least 90 minutes, thus, further research should be conducted to assess users' perception of time while using the equipment.

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8. Appendix

Survey – Portuguese version

Olá,

O questionário que se segue é realizado no âmbito de uma tese do Mestrado em Gestão da Católica Lisbon School of Business and Economics. O questionário é anónimo, pelo que, qualquer informação recolhida através do mesmo não permitirá identificar o respondente e será tratada exclusivamente para fins de investigação académica.

A tese em que se insere procura desenvolver e testar um novo conceito de uma experiência imersiva de realidade virtual no futebol dirigida principalmente aos adeptos portugueses que assistem aos jogos na TV.

Ao longo do questionário poderá acompanhar o seu progresso. Peço que responda com a maior sinceridade possível para que possam ser retiradas deste estudo conclusões que correspondem à realidade.

Agradeço muito a sua colaboração.

Pedro.

Relativamente ao seu papel na indústria do futebol, quais das seguintes frases melhor o/a descreve? Pode selecionar até 2 opções.

- Eu sou um adepto que consome futebol ocasionalmente.
- Eu sou um adepto que consome futebol ativamente.
- Eu sou um antigo jogador (amador ou profissional).
- Eu sou colaborador de um clube de futebol e exerço funções corporativas.
- Eu sou colaborador de um clube de futebol e exerço funções desportivas (ex: treinador, fisioterapeuta, etc).
- Eu não gosto de futebol e não o consumo.

Se tivesse que dizer uma percentagem de jogos de futebol que vê em casa durante uma época desportiva comparativamente aos que vê em outros sítios (ex: estádio, café, etc) qual seria essa percentagem? Por favor, arraste a barra.

Barra

(7-point semantic scale) **Quando está a ver jogos de futebol em casa, com que frequência os vê sozinho? (1-Nunca; 7-Sempre)**

(Selecionar um ponto)

Quando assiste a um jogo de futebol em casa prefere vê-lo sozinho ou acompanhado?

- Sozinho
- Acompanhado

Quão satisfeito está com a sua atual experiência de visualização de jogos de futebol na TV? (1-Muito insatisfeito; 7-Muito satisfeito)

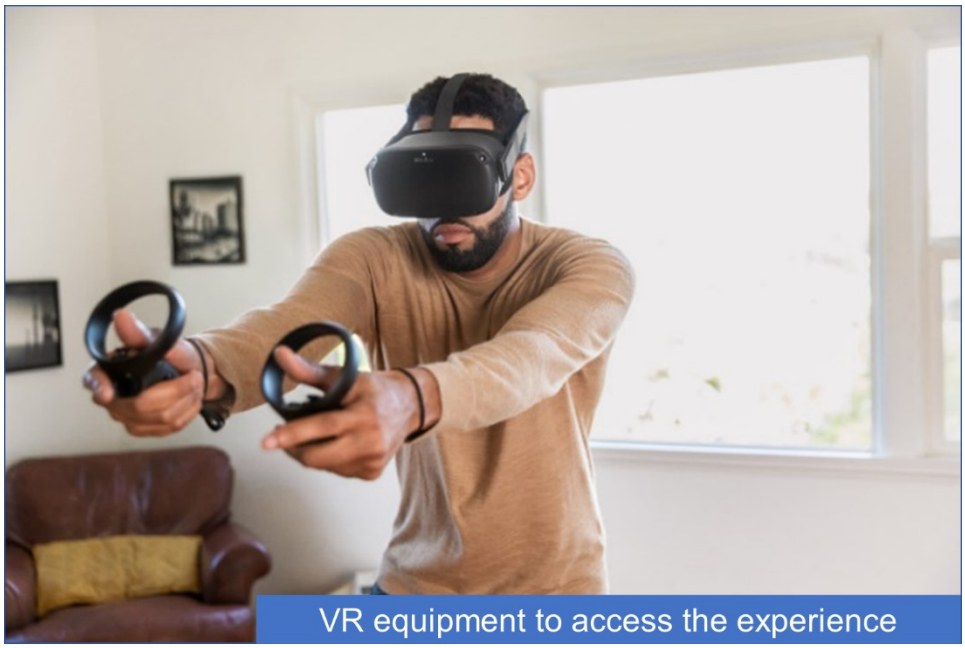
(Selecionar um ponto)

Quão familiarizado está com tecnologias de realidade virtual? (1-Nada familiarizado; 7-Totalmente familiarizado)

(Selecionar um ponto)

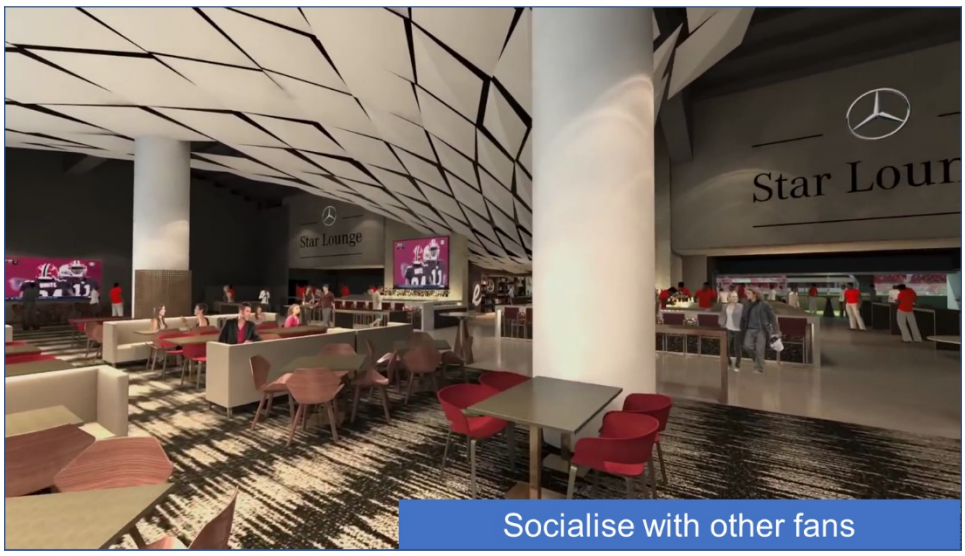
Esta tese pretende desenvolver e testar um novo conceito de uma experiência de realidade virtual (RV em diante) dirigida principalmente aos adeptos portugueses de futebol que vêem os jogos em casa. O objetivo é criar uma experiência imersiva para os adeptos, que lhes permita viver uma experiência semelhante à experiência real de ir ao estádio. Nesta experiência cada utilizador é representado por um avatar, que se define como um boneco que representa o utilizador online em experiências de realidade virtual. Através de um equipamento de RV os utilizadores da experiência podem comunicar por voz com outros

adeptos utilizadores da experiência, ter acesso a informação em direto, reagir virtualmente aos momentos de jogo (ex: gritar, bater palmas, cantar...) como faz no estádio e ter acesso a momentos e pontos de vista que a experiência atual de visualização de jogos na TV não oferece. As imagens que se seguem ajudarão a melhor entender a experiência de RV proposta e as funcionalidades incluídas.

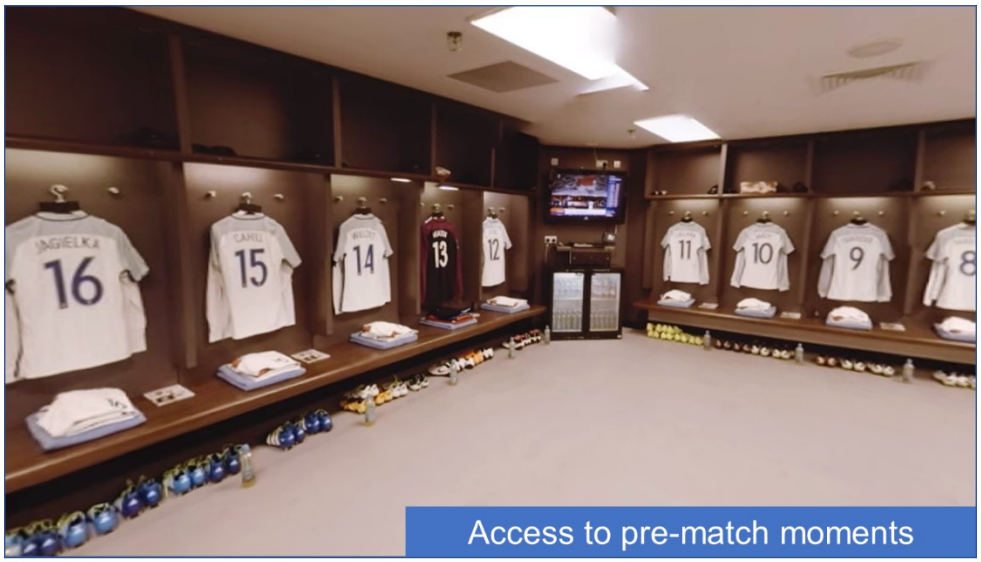


VR equipment to access the experience

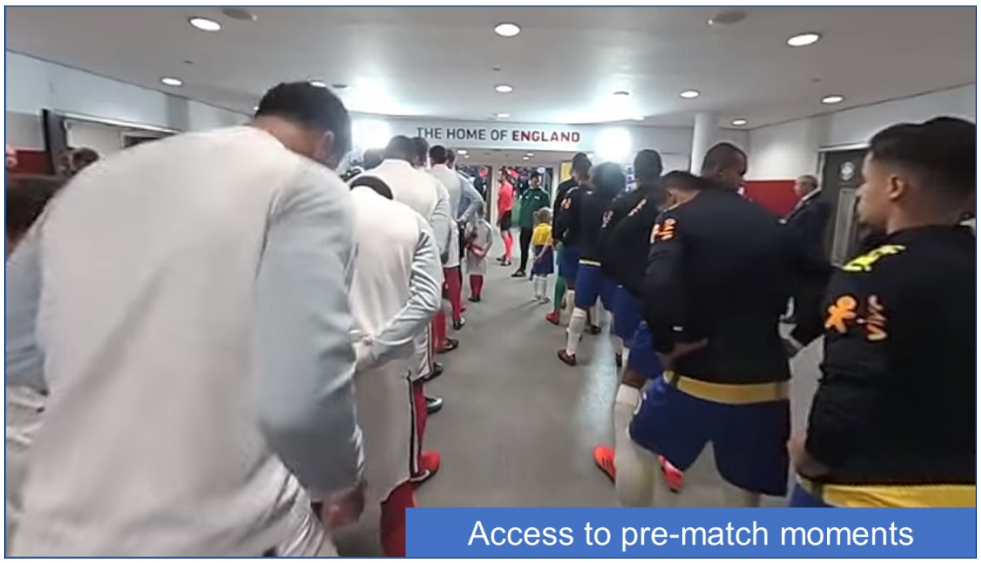
Socialise with other fans



Socialise with other fans



Access to pre-match moments



Access to pre-match moments

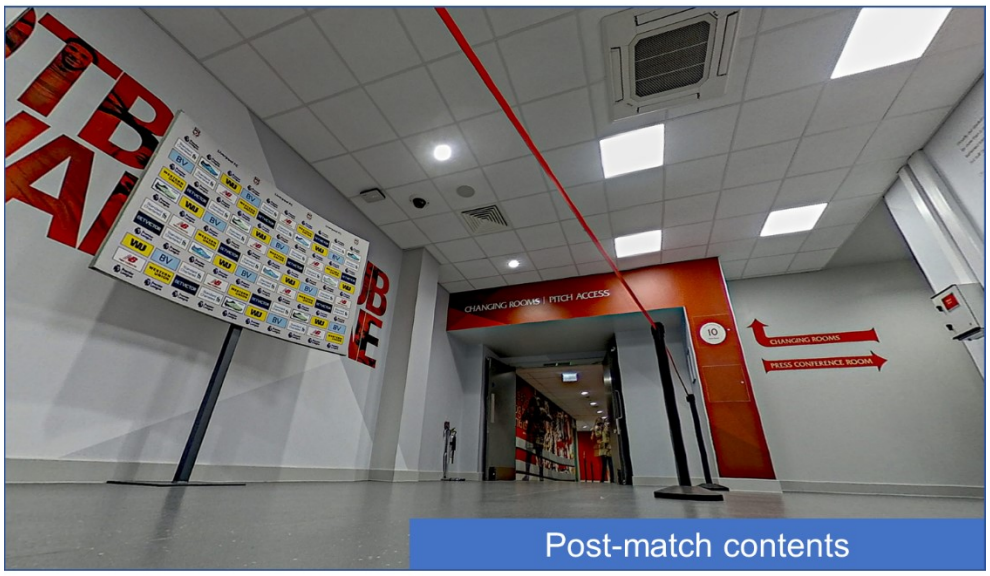

Different points of view: centre or side

Virtual cabin

Other perspectives (eg: substitutes bench)

From a player's point of view


ATLANTA IS UNITED
Historical data
1-0 Euro 2016: 2016/07/10
2-1 Friendly: 2015/01/23
DISCOUNT: At the end of the match you can find the team's shirt 15% OFF in the store.
Match stats
Goals: 2
Assists: 1
Distance covered: 9,76 km
Pass percentage: 87%
Live statistics and information


CHANGING ROOMS | PITCH ACCESS
CHANGING ROOMS
PRESS CONFERENCE ROOM
Post-match contents


TEAM STORE
Virtual store

(5-point Likert scale) **Qual é o seu nível de utilizador de equipamentos de RV?**

- Eu nunca experimentei equipamento de RV.
- Eu já experimentei equipamento de RV uma vez.
- Eu já experimentei equipamento de RV algumas vezes.
- Eu uso equipamento de RV frequentemente.
- Eu uso equipamento de RV todos os dias.

Indique de 1 a 7 até que ponto concorda com as seguintes afirmações. (1-Discordo totalmente; 4-Não concordo nem discordo; 7-Concordo totalmente)

- Usar equipamento de RV para ter acesso à experiência proposta seria útil para mim.
- Usar equipamento de RV tornaria mais produtiva a minha experiência de visualização de jogos de futebol.
- A experiência iria-me permitir ter acesso a mais informação e conteúdos relacionados com futebol.
- Usar equipamento de RV para ter acesso à experiência proposta iria-me permitir conhecer mais adeptos.
- Acredito que usar equipamento de RV iria proporcionar-me uma experiência similar à experiência de ir ao estádio.
- Acredito que será fácil encontrar equipamento de RV à venda.
- Acredito que seria fácil operar o equipamento RV.
- Facilmente me tornaria especialista em usar equipamento de RV.
- Eu penso que teria facilidade em encontrar na experiência proposta a informação e conteúdos relacionados com futebol que eu mais gosto.
- Acredito que através do equipamento RV seria fácil interagir com outros adeptos utilizadores da experiência.
- O propósito da experiência RV apresentada é claro e compreensível.
- Acredito que me iria divertir a usar o equipamento RV.
- A experiência apresentada seria divertida.
- Usar o equipamento de RV seria uma boa maneira de passar o meu tempo livre.
- De forma geral, eu acho interessantes as funcionalidades e aspetos da experiência de RV apresentada.

Indique de 1 a 7 até que ponto concorda com as seguintes afirmações relativamente à sua curiosidade e interesse em futebol. (1-Discordo totalmente; 4-Não concordo nem discordo; 7-Concordo totalmente)

- Em geral, eu gosto de ver jogos de futebol mesmo que não sejam de equipas que eu gosto.
- Tenho curiosidade em aprender sobre futebol.
- Gosto de procurar informação e conteúdos relacionados com futebol só por curiosidade.
- Eu sou interessado(a) em produtos/experiências inovadoras.
- Diversos aspetos da experiência apresentada despertaram a minha curiosidade.

Indique de 1 a 7 até que ponto concorda com as seguintes afirmações relativamente a influências externas na sua possível adoção de equipamento de RV e da experiência apresentada. (1-Discordo totalmente; 4-Não concordo nem discordo; 7-Concordo totalmente)

- A presença dos meus amigos na experiência proposta é útil para o meu aproveitamento da experiência.
- A presença dos meus amigos na experiência iria ajudar-me a viver a experiência.
- Se os meus amigos comprarem o equipamento de VR é muito provável que eu também irei comprar.
- Os clubes e as federações de futebol devem apoiar a utilização do equipamento de RV para ter acesso à experiência.

Indique de 1 a 7 até que ponto concorda com as seguintes afirmações sobre o seu envolvimento com o futebol. (1-Discordo totalmente; 4-Não concordo nem discordo; 7-Concordo totalmente)

- Eu conheço os plantéis da maior parte das equipas dos meus campeonatos preferidos.
- Todas as épocas compro produtos dos meus clubes favoritos (ex: camisola principal).
- Eu procuro ativamente informação e conteúdos relacionados com futebol.
- Eu sinto excitação e ansiedade quando vejo jogos das minhas equipas favoritas.
- Eu vejo todos os jogos das minhas equipas favoritas quer no estádio quer na TV.

- Eu falo muito frequentemente de futebol com outras pessoas (ex: amigos, família, colegas).

Indique de 1 a 7 até que ponto concorda com as seguintes afirmações sobre interações sociais na experiência apresentada. (1-Discordo totalmente; 4-Não concordo nem discordo; 7-Concordo totalmente)

- Acho importante poder comunicar por voz com outros adeptos utilizadores da experiência.
- Acho interessante poder interagir com outros adeptos utilizadores da experiência.
- Acho interessante poder colaborar com outros adeptos utilizadores da experiência para contribuirmos em conjunto para o ambiente do estádio.

Indique de 1 a 7 até que ponto concorda com as seguintes afirmações relativas ao seu consumo de informação e conteúdo relacionados com o futebol. (1-Discordo totalmente; 4-Não concordo nem discordo; 7-Concordo totalmente)

- Gosto de receber atualizações ao vivo relacionadas com as minhas equipas favoritas.
- Procuro constantemente informação e conteúdo sobre futebol.
- Eu procuro informação relacionada com o futebol porque isso permite-me ter mais um tema de conversa que me ajuda a socializar.
- Eu procuro informação enquanto estou a ver um jogo.
- Eu procuro informação durante os meus tempos livres.

(7-point semantic scale) **Relativamente a comprar equipamento de RV para ter acesso à experiência apresentada, eu considero que é:**

- Negativo-Positivo
- Insatisfatório-Satisfatório
- Desfavorável-Favorável

(7-point semantic scale) **Relativamente a usar equipamento de RV para ter acesso à experiência apresentada, eu considero que é:**

- Negativo-Positivo
- Insatisfatório-Satisfatório
- Desfavorável-Favorável
- Desconfortável-Confortável
- Aborrecido-Excitante
- Inferior (à experiência tradicional de TV)-Superior
- Desmotivador-Motivador (para ver mais futebol)

(7-point Likert scale) **Indique de 1 a 7 até que ponto concorda com as seguintes afirmações relativas à sua intenção de compra de equipamento RV para ter acesso à experiência apresentada. (1-Discordo totalmente; 4-Não concordo nem discordo; 7-Concordo totalmente)**

- É provável que irei comprar equipamento de RV num futuro próximo.
- Pretendo comprar equipamento de RV num futuro próximo.
- Comprar equipamento de RV num futuro próximo é importante para mim.
- Eu estaria disposto a recomendar aos meus amigos o equipamento de VR apresentado.
- Se a(s) minha(s) equipa(s) favorita(s) oferecer(em) a experiência é provável que eu irei comprar equipamento de RV.

(7-point Likert scale) **Indique de 1 a 7 até que ponto concorda com as seguintes afirmações relativas à sua intenção de usar equipamento RV para ter acesso à experiência apresentada. (1-Discordo totalmente; 4-Não concordo nem discordo; 7-Concordo totalmente)**

- É provável que eu irei usar equipamento de RV num futuro próximo.
- Pretendo usar equipamento de RV num futuro próximo.
- Usar equipamento de RV num futuro próximo é importante para mim.
- Se a(s) minha(s) equipa(s) favorita(s) oferecer(em) a experiência é provável que eu irei usar equipamento de RV.

(7-point semantic scale) **Imagine this is the VR equipment that gives you access to the experience proposed and it is selling for 250€. I consider the price of €250…**

Absurdo-Aceitável

Estamos quase a finalizar. Só preciso de mais uns detalhes seus.

Qual é a sua idade?

- < 18
- 19-24
- 25-34
- 35-44
- 45-54
- > 55

Qual é o seu género?

- Masculino
- Feminino

Qual é a sua nacionalidade?

- Portuguesa
- Outra

Qual é o seu grau de escolaridade mais elevado?

- Escola primária
- Secundário
- Curso profissional
- Licenciatura
- Mestrado
- Doutoramento

Em qual das classes se encaixa o seu salário mensal?

- <500€
- 500€-999€
- 1000€-1999€
- 2000€-2999€
- 3000€-4500€
- >4500€

Survey – English version

Hi,

The following questionnaire is carried out under a master thesis of MSc in Management program from Católica Lisbon School of Business and Economics. The questionnaire is completely anonymous, whereby, any information collected through it will not allow the researcher to identify the respondent and information will be treated exclusively for academic purposes.

The thesis under which it is carried out intends to develop and test a new concept of an immersive virtual reality football experience targeting Portuguese football fans who watch the games at home.

Throughout the questionnaire, you can follow your progress. I kindly ask you to answer with as sincerely as possible so that relevant conclusions can be drawn from this study.

Thanks for your collaboration.

Pedro

In terms of your role in the football industry select the sentences that better describes you.

- I am a fan who occasionally consumes football.
- I am a fan who actively consumes football.
- I am a former player (amateur or professional).
- I work in a business department of a football club.
- I work in the sports department of a football club (eg: coach, physiotherapist, etc).
- I do not like football and do not consume it.

For each season in general, if you had to say a percentage, what would the percentage of football matches you watch at home comparing to other places like stadium or café? Please move the bar.

Bar

(7-point semantic scale) **When you are watching football matches at home, how frequently do you watch them alone? (1-Never; 7-Always)**

(Select a point)

When watching a football match at home, do you prefer to do it alone or accompanied?

- Alone
- Accompained

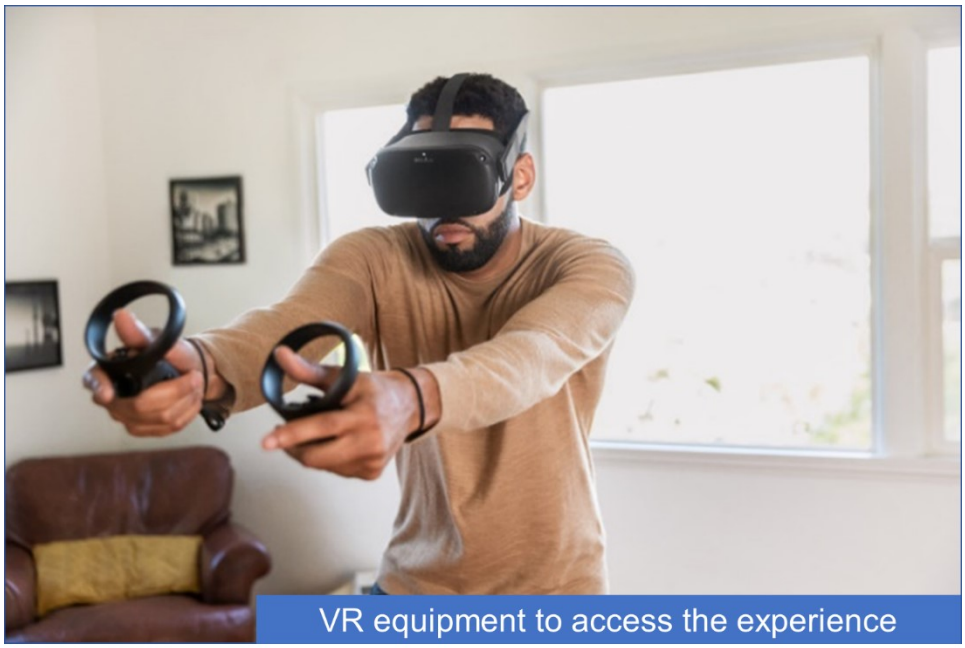
How satisfied are you with the actual TV experience of watching football? (1-Very unsatisfied; 7-Very satisfied)

(Select a point)

How familiarised are you with Virtual reality technologies? (1-totally unfamiliarised; 7-totally familiarised)

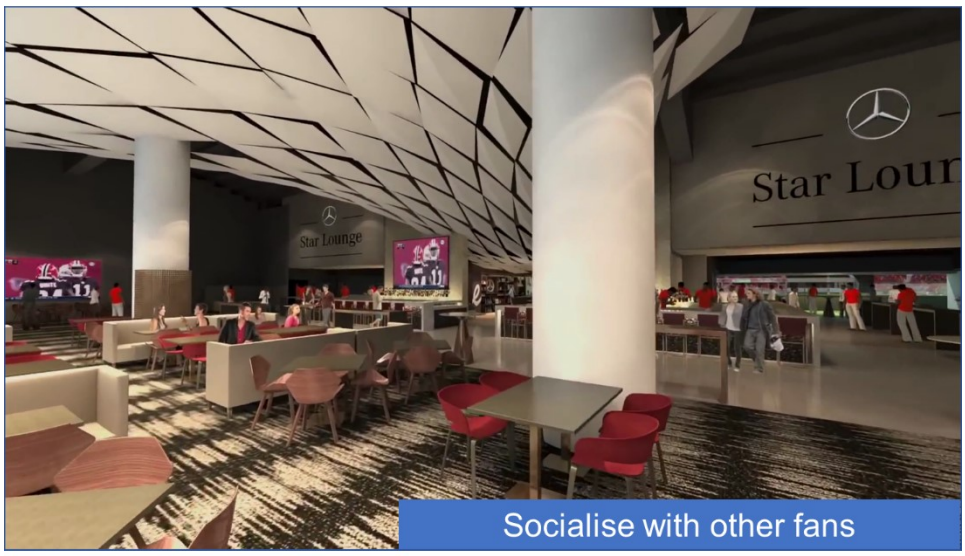
(Select a point)

This study intends to develop and test a new concept of a virtual reality experience (VR onwards) targeting Portuguese football fans who watch the matches at home. The objective is to create an immersive experience that allows these fans to live an experience similar to the real experience of attending the stadium in a matchday. In this experience, each user is represented by an avatar, which if defined as an online representation of the person in virtual reality experiences. Through the VR equipment, users can communicate through voice and interact with other users, get access to live information, users can virtually react to the different moments of the game (eg: shout, clap hands, chant…) like they do in the stadium. Users can also get access to moments and different points of view that the traditional TV watching experience cannot offer. The following images will help you to better understand the VR experience and its features.

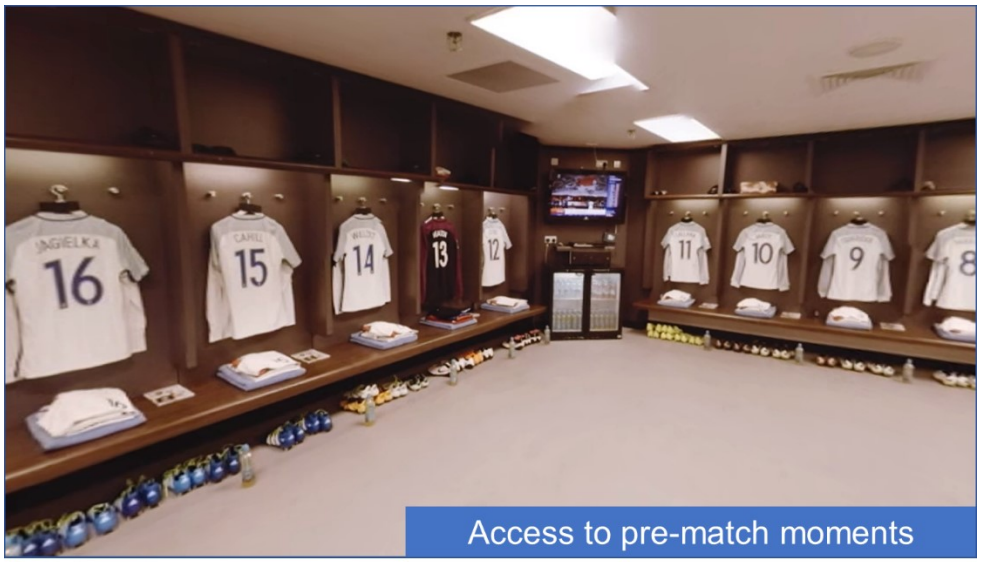


VR equipment to access the experience

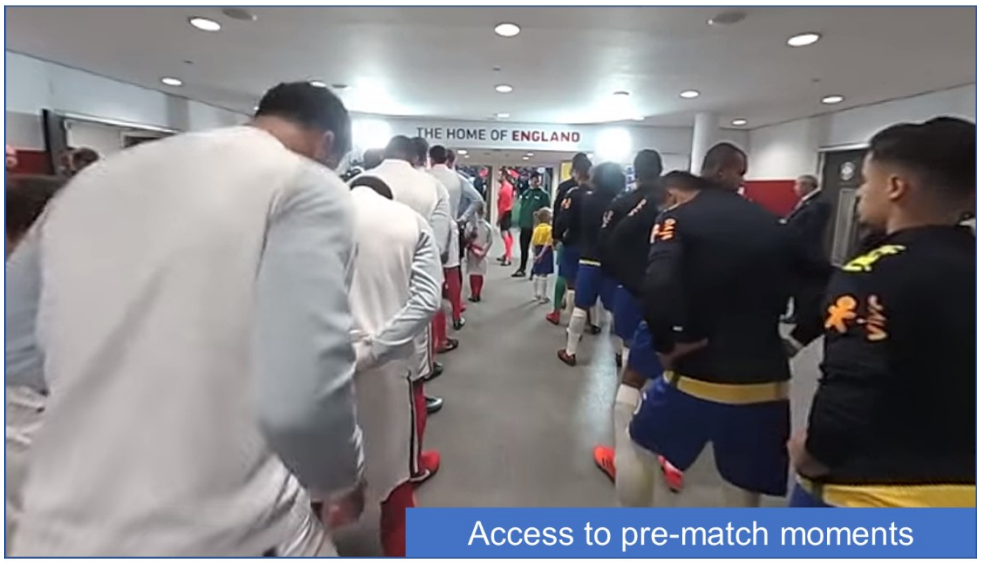
Socialise with other fans



Socialise with other fans



Access to pre-match moments



Access to pre-match moments

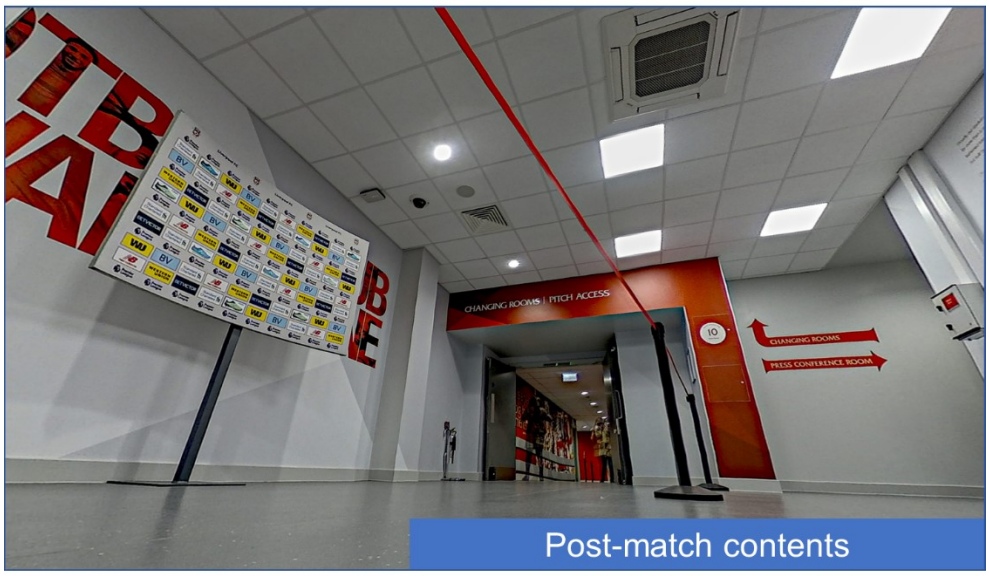

Different points of view: centre or side

Virtual cabin

Other perspectives (eg: substitutes bench)

From a player's point of view

Live statistics and information



Post-match contents

Virtual store

(5-point Likert scale) **What it your user level regarding VR equipment?**

- I have never tried it.
- I already tried it once.
- I already tried it a few times.
- I use VR equipment frequently.
- I use VR equipment everyday.

Select to what extent do you agree with the following sentences about your perceptions. (1-Strongly disagree; 4-Neither agree or disagree; 7-Strongly agree)

- Using VR equipment for the football experience proposed would be useful in my life.
- I believe that using VR equipment would make my viewing experience more productive.
- I believe that the VR football experience proposed would allow me to get access to more football related information and content.
- Using the VR equipment for the football experience proposed would allow me to meet other fans.
- I believe using the VR equipment for the football experience proposed would allow me to get access to an experience similar to a real match-day.
- I believe it would be easy to find VR equipment that would allow me to get access to the VR football experience proposed.
- I believe it would be easy to operate the VR equipment.
- I would easily become skilful at using the VR equipment.
- I think it would be easy to find the information and content I want in the VR football experience proposed.
- It would be easy to interact with other users of the experience through the VR equipment.
- The intention of the VR proposed experience is clear and understandable.
- I believe I would have fun using VR equipment.
- I believe the VR football experience proposed would be entertaining.
- Using VR equipment is a good way to spend my leisure time.
- Overall, I find interesting several aspects of the proposed VR experience.

Select from 1 to 7 your level of agreement with the following sentences about your curiosity. (1-Strongly disagree; 4-Neither agree or disagree; 7-Strongly agree)

- In general, I like to watch football games even if my favourite teams are not playing.
- I am interested in learning about football.
- I like to search for football related information and content just out of curiosity.
- I am interested in innovative products/experiences.
- Several features of the VR experience proposed arouse my curiosity.

From 1 to 7 select your level of agreement with the following sentences about external influences that may impact your adoption of VR. (1-Strongly disagree; 4-Neither agree or disagree; 7-Strongly agree)

- I believe my friends would be useful for the VR experience proposed.
- I believe my friends would be helpful using the VR equipment.
- If my friends purchase the VR equipment, it is very likely that I will also purchase it.
- I believe clubs and federations should support the usage of the VR equipment.

From 1 to 7 select your level of agreement with the following sentences about your involvement in football. (1-Strongly disagree; 4-Neither agree or disagree; 7-Strongly agree)

- I know the squads of most of the teams of my favourite leagues.
- Every season, I buy football merchandising (eg: teams shirts).
- I actively search for football information and content.
- I feel excited or anxious when I am watching my favourite teams.
- I watch every game of my favourite(s) team(s) either on TV or in the stadium.
- I usually speak about football with others (eg: friends, family, acquaintances).

From 1 to 7 select your level of agreement with the following sentences about social interactions in the experience. (1-Strongly disagree; 4-Neither agree or disagree; 7-Strongly agree)

- I find interesting that the experience allows me to communicate with other fans through voice.
- I find interesting that the experience allows me to interact with other fans.
- I find interesting that the proposed experience allows me to collaborate with other fans in the virtual environment to create the stadium's ambience.

From 1 to 7 select your level of agreement with the following sentences regarding your consumption of information about football. (1-Strongly disagree; 4-Neither agree or disagree; 7-Strongly agree)

- I like to receive live updates related about my favourite teams.
- I am constantly seeking information and content about football.
- I seek football related information because it allows me to socialise by providing conversational subject.
- I seek football information and content while I am watching a match.
- I seek football information when I am in my leisure time.

(7-point semantic scale) **Regarding purchasing the VR equipment to get access to the experience proposed I consider it is:**

- Negative-Positive
- Unsatisfactory-Satisfactory
- Unfavourable-Favourable

(7-point semantic scale) **Regarding using the VR equipment to get access to the experience proposed I consider it is:**

- Negative-Positive
- Unsatisfactory-Satisfactory
- Unfavourable-Favourable
- Uncomfortable-Comfortable
- Boring-Exciting
- Inferior (to Traditional TV experience)-Superior
- Dissuades me-Motivates me (to watch more football)

(7-point Likert scale) **From 1 to 7 select your level of agreement with the following sentences about your intention to purchase the VR equipment to access the experience. (1-Strongly disagree; 4-Neither agree or disagree; 7-Strongly agree)**

It is likely that I will purchase a VR device in the foreseeable future.

- I intend to purchase VR equipment in the foreseeable future.
- Purchasing VR equipment in the future to get access to the experience proposed is important to me.
- I would be willing to recommend to my friends the VR equipment presented so that they can access the proposed experience.
- If my favourite teams offer the experience it is likely that I will buy the equipment.

(7-point Likert scale) **From 1 to 7 select your level of agreement with the following sentences about your intention to use the VR equipment to access the experience. (1-Strongly disagree; 4-Neither agree or disagree; 7-Strongly agree)**

- It is likely that I will use a VR device in the foreseeable future.
- I intend to use VR equipment in the foreseeable future.
- Using VR equipment in the foreseeable future is important to me.
- If my favourite teams offered the VR experience it would be very likely I would use VR equipment.

(7-point semantic scale) **Imagine this is the VR equipment that gives you access to the experience proposed and it is selling for 250€. I consider the price of €250…**

Absurd-Acceptable

We are almost there, just a few more information about you.

How old are you?

- < 18
- 19-24
- 25-34
- 35-44
- 45-54
- > 55

What is your gender?

- Male
- Female

What is your nationality?

- Portuguese
- Other

What is your highest education level?

- Elementary School
- High School
- Professional course
- Bachelor
- Master
- Doctorate

What is your monthly income?

- <500€
- 500€-999€
- 1000€-1999€
- 2000€-2999€
- 3000€-4500€
- >4500€