

Repositório ISCTE-IUL

Deposited in *Repositório ISCTE-IUL*:

2022-07-20

Deposited version:

Accepted Version

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Souto, D., Oliveira, P. & Loureiro, S. M. C. (2022). Exploring a new form of interaction in the Match Day: Virtual Reality Technologies among Fans of Soccer. *Journal of Promotion Management*. 28 (6), 729-748

Further information on publisher's website:

10.1080/10496491.2021.2015517

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Exploring a new form of interaction in the Match Day: Virtual Reality technologies among fans of soccer

Abstract

Virtual reality (VR) is a technology with potential to disrupt the soccer industry since fans are willing to enjoy new home-watching experiences. This study analyzes the concept of a new VR soccer experience by means of using the extended technology acceptance model to determine the factors that lead to the adoption of VR equipment in the matchday. Data was collected and 203 valid responses were obtained. The results were treated 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 VR and its integration in sports. This study paves the way to further research on this matter and provides several insights and recommendations for sports organizations on how to design their offerings to soccer fandom.

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

Introduction

Virtual Reality (VR) applications are growing into an increasing market size, with VR technologies being used in manufacturing, medicine, art, navigation, education and gaming (Loureiro, Guerreiro, Eloy, Langaro & Panchapakesan, 2019). In sports industry, the adoption of VR is still in an early stage, despite being acknowledged as a promising technology for various applications, among them, improving fans' experience while watching sports games (Kim & Ko, 2019).

The perspective that VR may simulate the real experience of attending the stadium in a matchday raises a common interest among managers and researchers, given the potential size of the opportunity. Due to its embryonic stage, no study so far has explored this topic from the perspective of understanding the triggers that may influence its development.

The current study addresses this research opportunity and explores the antecedents for the adoption of VR in improving fans' experience while watching sports games. To address this, the following research question was defined: "What are the most significant factors influencing the adoption of VR among soccer fans?" Focus lies on soccer. Else than being responsible for an expressive business size, with the European soccer leagues accounting for more than €28 billion (Barnard, Boor, Winn, Wood, & Wray, 2019), the largest share of revenues in soccer derives from negotiating the rights for broadcasting the games to fans' homes (Delloite, 2019). This reveals the strategic relevance of exploring opportunities related to those fans who currently watch soccer games at home, enjoying an experience which is quite limited in flow and sense of presence (Kim & Ko, 2019).

For addressing this research question, an immersive VR soccer experience simulating the match day was developed in a concept board including avatars and covering the pre-

match, the match itself, including live statistics and exclusive viewpoints and the post-match phases. The prototype was tested with soccer fans envisioning to understand the factors influencing adoption of VR. The theory of Technology Acceptance Model has anchored the investigation. Implications for theory and practice are presented.

Literature Review

Sport Fans

The definition of fan comes from the word ‘fanatic’, referring to individuals who are passionate devotee of sports with an affiliation that generates an emotional connection and value derived from group membership (Jacobson, 2003). 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 organization. Moreover, people have a necessity for frequent, stable, pleasant, emotionally involving and long-lasting connections with others and fans use sports to satiate this socializing need, either when attending a sport event with others, or watching it at home with friends (Clark, Apostolopoulou, & Gladden, 2009). Fandom is unique in the sense that it allows individuals to experience a unique sense of belonging which is almost intimate (Melnick, 1993; Shuv-Ami, Vrontis, & Thrassou, 2018) because before being a group, the group of fans already possess commonalities such as the loyalty and identification with the team (Jacobson, 2003).

The level of identification with a team positively influences attendance to the games, number of games watched, team-related purchases (Carlson, Donovan, & Cumiskey, 2009) and information consumption (Rynarzewska, 2018). The raise of online channels and social media has fostered new consumption habits among fans, who start interacting with players,

teams, events and brands (REPUCOM, 2015), consume information from several media (Rynarzewska, 2018; Thrassou, Vrontis, Kartakoullis, & Kriemadis, 2012) and aspire for higher value experiences (Stavros, Meng, Westberg, & Farrelly, 2014). In this context, the use of VR devices increases consumers' perceived value by positioning them in the centre of a more dynamic experience in which they have higher level of autonomy comparing to experiences provided by other technologies, linear television for example (Flavián et al., 2019). Furthermore, VR also increases the value for the partners and sponsors as a result of the hedonic benefits provided by the VR experience (Loureiro et al., 2019).

Virtual reality and Avatars

While defining the experience to be designed and tested, it was considered the use of VR as a way of immersion into the matchday in a real-time 360 degrees video capturing the various phases of the match (pre, during and post), which were juxtaposed with information and combined with synthetic virtual worlds where users would immerse as avatars. In view of that, the following paragraphs explore the main definitions associated to VR and avatars.

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) referring to the fact that technologies nowadays are portable and wearable" (Flavián et al., 2019), a human factor (presence) referring to the user's sensations of being in an environment different from the real one, and a behavioral factor (interactivity) defined as the user's capacity to navigate and modify the virtual environment (Flavián et al., 2019).

Based on HTI, Flavián et al., (2019) developed Embodiment-Presence-Interactivity (EPI) framework which positions each technology in accordance with the three factors

allowing managers and researchers to better select devices and understand their impact on the consumer experience. Different types of VR experiences can be located in EPI framework: from 360-degree video experienced from a fixed position to 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 (Loureiro et al., 2019). As such, VR experience varies according to the content and 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).

The simulation of one's presence in VR may offer a playful environment in which users represented by avatars may interact (Kohler, Matzler, & Füller, 2009). An avatar is a customized 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). Virtual worlds such as Second Life may provide consumer-company immediate and media-rich interactions (Suh & Lee, 2005), with users creating their own experiences within it (Kohler et al., 2011) and enjoying them with spontaneity due to the absence of social judgement present in real relations (Bargh, McKenna, & Fitzsimons, 2002).

Proposed Theoretical model: TAM evolved into VR

The first version of TAM was developed to explain the determinants of people's acceptance of a broad range of technologies by examining their beliefs and attitudes towards it, including perceived product usefulness (PU), and perceived ease of use (PEOU) (Davis, Bagozzi, & Warshaw, 1989). The model has been adapted to various technologies (Rynarzewska, 2018),

including VR. Manis and Choi (2019) have proposed that in the context of VR new variables are included, namely, interest and curiosity, past use, attitude towards price and perceived enjoyment (PE) (Rynarzewska, 2018; Davis, Bagozzi, & Warshaw, 1992; Um, 2019).

The current study builds on the previous work of Manis and Choi (2019) proposing a model which includes perceived usefulness, perceived easiness to use and perceived enjoyment as constructs used to explain effects on attitude towards purchasing the VR equipment, intentions of purchasing it, attitude towards price, attitude towards using the equipment and intentions towards using it. Moreover, the model explores antecedents related to subjective norms, involvement, information consumption, social interactions, interest, gender and past use. The following paragraphs support the proposition of hypotheses (as in Figure 1)

Subjective norms (SN) are defined as individuals' judgment regarding others' expectations concerning their behavior (Sun & Zhang, 2006). SN can influence the adoption of new technologies by means of compliance, internalization and identification (Sun & Zhang, 2006). The present study proposes that SN plays an important role in explaining VR adoption, with effects on PU. One might think that if others who are important for him/her use a certain technology, it is a useful one. In the context of virtual worlds, Holsapple and Wu (2007) also found a significant SN-PU effect. Therefore:

H1: Social Norms have a positive effect on PU.

Moreover, it is proposed that individuals with high enduring involvement with soccer will perceive the VR experience more enjoyable and useful, as they are more active in searching for product-related information and responding to product communications (Deng et al., 2019). Thus, the level of involvement influences perceptions regarding the usefulness

and enjoyment of the experience. The relevance of considering involvement in the model is reinforced by the fact that the use of avatars allows active participation of consumers in the creation process which generates higher familiarity with the product/service and may lead to higher attachment and involvement (Kohler et al., 2011). The following hypotheses capture the effects:

H2: Individuals highly involved present higher levels of PU.

H3: Individuals highly involved present higher levels of PE.

Information consumption is important to satisfy soccer fans' need to follow the team and socialize as it provides subject of conversation (Litman, 2008). It is proposed that as VR experience provides a rich source of information, fans will perceive it as useful and enjoyable.

H4: Information consumption positively affects PU.

H5: Information consumption positively affects PE.

Social interactions are also considered in the model, as the VR experience conveys communication and collaboration among users, which is expected to positively influence its acceptance (Holsapple and Wu, 2007). Therefore it is expected that:

H6: Social interactions with other users positively influences PU.

H7: Social interactions with other users positively influences PE.

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 soccer experience proposed, it is expected that interest curiosity triggered by the experience of learning and enjoying something through exploration might lead to higher adaptation to the technology (Manis & Choi, 2019), thus, higher PEOU, as hypothesized.

H8: Interest curiosity positively influences PEOU.

Finally, previous studies also identify effects of gender in the adoption of technologies (Clark, Apostolopoulou, & Gladden, 2009). Males are more pragmatic and task-oriented than females, while women experience higher technology-anxiety, lower self-efficacy (Sun & Zhang, 2006). These findings suggests that gender may offer an important understanding for the adoption of VR, with effects on PU and PEOU.

H9: Gender significantly influences PU.

H10: Gender significantly influences PEOU.

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. Users of a technology who experienced it before, use their prior experiences to elaborate on perceived ease of use PEOU and usefulness (PU) (Sun & Zhang, 2006). In agreement, the present study considers the positive influence of past use on PU and PEOU.

H11: Past use positively influences PU.

H12: Past use positively influences on PEOU.

H13: Past use positively influences VR equipment use intention.

The theoretical model further evolves on the work of Manis and Choi (2019) proposing that PE is positively influenced by PEOU and arguing that an individual enjoys

more an experience that is easy to access, and does not require much effort and time to learn. Moreover, it is proposed that the more enjoyable is the experience the more useful it will be perceived as a replacement for the enjoyment fans would experience watching television otherwise. Therefore:

H14: PEOU positively influences PE.

H15: PE positively influences PU.

Once that the antecedents of PU, PE and PEOU are proposed, it is important to establish the relations of these constructs with attitudes and behaviors. It is proposed that the more individuals perceive the VR equipment as useful, enjoyable and easy to use, the more favorable they will become towards purchasing and using it (Davis, Bagozzi & Warshaw, 1989; Martínez-López, Feng & Esteban-Millat, 2020). These effects are proposed in the following hypotheses:

H16: PEOU positively influences attitude towards purchasing VR equipment.

H17: PEOU positively influences intention to purchase VR equipment.

H18: PEOU positively influences attitude towards using VR equipment.

H19: PEOU positively influences attitude towards purchasing VR equipment.

H20: PEOU positively influences intention to purchase VR equipment.

H21: PEOU positively influences attitude towards using VR equipment.

H22: PEOU positively influences attitude towards purchasing VR equipment.

H23: PEOU positively influences attitude towards using VR equipment.

H24: Attitude towards purchasing VR equipment positively influences intention to purchase VR equipment.

H25: Attitude towards using VR equipment positively influences use intention of VR equipment

When individual's perceptions of quality and performance of a product/service exceed his/her expectations, it leads to favorable attitudes towards the acceptance of its price

(Liao et al., 2008; Jiang, 2019). In accordance to that, the current 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 users' attitude towards the price of the VR equipment (Martínez-López, Feng & Esteban-Millat, 2020). The following hypotheses capture these effects:

H26: Perceived usefulness positively influences attitude towards price.

H27: Perceived enjoyment positively influences attitude towards price.

H28: Perceived ease of use positively influences Attitude towards price.

INSERT FIGURE 1 HERE

Methodology

An experimental design was developed. Soccer fans who watch the games at home were recruited. An online survey was conducted with respondents being recruited through several soccer-related social media groups in Portugal, by means of self-selection sampling (Saunders et al., 2009). Table 1 contains the constructs used in the survey. Seven-point Likert-scale and seven-point semantic differential scales were used.

INCLUDE TABLE 1 HERE

The stimuli

The stimuli was composed by a short description and images which simulated the VR experience (in the appendix). In the experience users and staff are represented by avatars and may interact through a VR HMD with haptic devices. Users have access to pre-match moments, feel the ambience in the locker room, the anxiety of the players waiting in the tunnel and experience entering in the pitch like a soccer player. During the match users may

watch the game from different angles, including from private virtual cabins, being able to contribute to the stadium atmosphere (e.g. shout or applause). They may also get access to live information, statistics and content that pop-up during the match. At the end, users can get access to post-match content like flash interviews and are invited to visit club's virtual store.

Results

In total 203 valid responses were obtained with 37% of respondents in the age between 16 and 24, 34% between 25 and 34, 23% between 35 and 44 and the remaining above 45. Regarding gender, 61% were men. Regarding education, almost 80% of the sample had bachelor degree or above.

Further on, data was analyzed using Structural Equation Modelling (SEM). 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-SEM was found the most appropriate approach because of the relatively small sample size considering soccer and unbalance between. The lack of literature combining VR and sports, more specifically soccer, also contributed to the choice of PLS approach. Moreover, SmartPLS software was chosen for its user-friendliness interface and advanced reporting (Ken Kwong-Kay Wong, 2013).

Measurement model

Table 2 includes indicators' loadings, means and standard deviations and, internal consistency and convergent validity measures. Results obtained for composite reliability (CR) and Cronbach's Alpha (CA) were above the threshold of 0.7 (Henseler et al., 2016; Hair et al., 2013). Average variance extracted (AVE) is greater than the acceptable level of 0.5 (Bagozzi & Yi, 1988) and individual loadings are above 0.68.

INCLUDE TABLE 2 HERE

Structural Equation Model

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 .

To avoid bias towards complex models, adjusted R^2 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 Attitude-Price 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. 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 ($D=6$). 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.

The results of the estimation of the structural model are in Table 3. Note that multicollinearity is present in involvement and information consumption linkages since coefficients are above |1| (Hair et al., 2013). In view of this result, variance inflation factor (VIF) was performed for identifying the level of multicollinearity where if VIF is lower than 5, the effect is considered moderate and not severe enough to warrant corrective measures. This assumption was accepted in the VIF obtained.

INSERT TABLE 3 HERE

Discussion

Results are initially discussed in view of the effects on intention to purchase, to use the VR equipment and attitude towards the price for acquiring the equipment. Concerning the first, the main drivers of VR equipment purchase are perceived usefulness (PU), which occupies a major role both directly and indirectly, and attitude towards purchasing the VR equipment, with perceived enjoyment (PE) having only indirect effects.

Concerning the intention to use the VR equipment, the larger direct predictor is captured by the attitude towards using VR, which is largely influenced by PU, moderately influenced by PE and slightly influenced by PEAU. Past use also exerts a direct influence on respondents' intentions to use. This result is supported by previous studies (Manis & Choi, 2019; Kim & Malhotra, 2005), confirming findings of Thompson et al. (1994) which indicate that previous exposure or usage of a certain technology positively influences future usage.

Finally, concerning the attitude towards price, PU comes in also as a major influence, with users who find VR soccer experience useful, having more positive perception on price. PEAU also influence price perceptions, despite its more limited effects. PE is not significant.

When analyzing the specific antecedents, among the main drivers of PU are users involvement with the sport, information consumption and PE. Thus, users that are highly involved with soccer, actively searching for information, watching every game and talking about it to others see the usefulness in accessing the game with VR equipment. Concerning information consumption, despite its large effect on PU, its effects are negative. In order to understand it, it is important to acknowledge the large and positive indirect effects it exerts on PU by means of PE. So, information consumption impacts PU only when PE is positively affected. This implies that respondents who constantly consume soccer information do perceive the VR experience as useful, but only if they see it as something enjoyable. This might relate to the fact that soccer fans that are sensitive to information consumption already have their sources and so the only way to convince them is if they see that VR could deliver the information in a more enjoyable manner than their current solutions. Moreover, social dimensions represented by social norms and social interactions also influence PU, despite the more moderate effects. So the more users sense that others expect them to use this type of technology (Holsapple & Wu, 2007) or appreciate the possibility of interacting with others while using it, the more useful the experience is perceived (Lee, Kim, & Choi, 2019). The effects of gender on PU were non-significant. This result might be due to the profile of respondents as they were fans of soccer who followed social media pages of their clubs and as such were probably more involved than an average fan, independent of gender. Finally, the effects of past use on PU were not significant.

Further on, PE emerges as the second most relevant antecedent, with indirect effects on intention to purchase VR equipment and on intention to use VR equipment. The main

antecedents of perceived enjoyment are information consumption, users' perceptions regarding the social interactions promoted in the VR experience and their level of involvement. Regarding the first aspect, when it comes to information fans who consume a lot of information about soccer seem to perceive the experience to be much more hedonic-oriented than utilitarian-oriented, finding the experience enjoyable and an attractive way to spend their leisure time. Regarding the influence of respondents' perceptions regarding social interactions, this relates fans use of sports to satiate the need to socialize with others who share the same fandom engagement (Theodorakis et al., 2012). This suggests that despite of the use of technology being an individual activity, this experience is social in nature. As the effects of social interactions are stronger on PE than on PU it is suggested that interacting with others is rather perceived as an hedonic value of the VR experience. Differently from expected the level of involvement affects PE in a negative manner. This may be due to highly involved soccer fans appreciating the utility of VR equipment but not perceiving it as an enjoyable replacement for their current solution for watching games.

Finally, the effects of perceived ease of use (PEAU) are also present, despite being rather small when compared with the others. So, despite that PEAU plays a role, the effects are not determinant for the adoption and use of VR equipment. The larger driver of PEAU is users' past use of VR, with users who were more experienced finding the technology easy to use. Curiosity plays a moderate role, confirming previous studies (Litman, 2008; Manis & Choi, 2019) suggesting that high interest in acquiring new knowledge, involving feelings of pleasure associated with intellectual mastery, leads to higher PEOU. Gender on the other hand, does not play a significant role. Despite that 40% of the sample were women, there was no change in terms of perception regarding easiness to use.

Conclusions and Implications

Theoretical Contribution

The present study has two main theoretical contributions to the VR and sports marketing. First, it contributes to TAM literature by extending the model considering the aspects of a very peculiar industry, soccer, and its consumers who are of a very particular type in terms of consumption habits and loyalty. In that sense, subjective norms, information consumption, involvement, social interactions, interest curiosity, past use, and gender are included as extended constructs to explain acceptance. Moreover, VR use and purchase integrate the model as separate dimensions.

Second, findings reveal the effects that explain adoption. PU is spotted as the most influential factor on VR purchase intention and on intentions towards using it. The most influential antecedents of PU are users' level of involvement with soccer and PE. Thus, fans that are more involved with soccer perceive higher utilitarian benefits related to the experience. The effects of PE shows that enjoying the experience is a fundamental aspect to drive perceived usefulness of the VR equipment. In addition, PE is mostly influenced by information consumption and social interactions with other users. Both constructs need to be perceived primarily as hedonic, as no real utilitarian value is expected.

Regarding VR use intention, it is predicted by the attitude towards using VR, which is strongly influenced by PU and moderately, by PE. Thus, utilitarian benefits also play a fundamental role in determining VR equipment use intentions. Moreover, those who have already experienced a VR are keener to use the equipment to get access to the experience.

Managerial Implications

The present study reveals the triggers of VR technology adoption in soccer, with its introduction allowing sports organizations to extend the existing broadcast business by providing fans an innovative and immersive way to attend the matchday.

The purchase of VR equipment is directly associated with users perceiving it as a useful replacement for their current broadcast solutions. Therefore, the utilitarian value of VR is a major priority to build into the offering and its communications. The higher the level of fans involvement with soccer, the more relevant is perceived usefulness. On the other hand, perceived enjoyment plays a complementary role, triggering VR equipment purchase intentions only when perceived for its utility in replacing the hedonic value experienced in broadcasting. So when it is perceived as a more useful and easier way to enjoy and appreciate the game; not primarily for its enjoyment value. The triggers of perceived enjoyment are mostly associated with social interactions built in by means of avatars and live information on the game.

Moreover, the use of VR equipment is also strongly influenced by PU, by means of its effects on users attitudes. However, PE also contributes to shape attitudes and therefore, usage. So despite the relevance of PU, the experience also needs to design for PE as this dimension will influence a more regular use of the technology. Moreover, while targeting and defining the promotional efforts, it is important companies invest on reaching those who already experienced VR and on building familiarity with the technology among those who have not (e.g. trial periods and demonstrations in-store), as past use contributes to VR equipment usage intentions.

Finally, considering that before COVID-19 the largest soccer stadiums were close to full capacity in matchdays, and currently are not opened to the public, the introduction of this technology-generated experience should not represent a threat to matchday revenues but

an opportunity to increase clubs' largest revenue source, television rights for broadcasting. Furthermore, sports organizations should also look this opportunity as an avatar marketing tool from which they can leverage and deliver a compelling and customizable experience, fundamental for the co-creation process, allowing organizations to get deeper insights from fans.

Limitations and Future Research

Despite of contributions, this study has some limitations that suggest further research. First the data was collected in Portugal among soccer fans who follow social media brand pages focused on soccer, which implies a higher level of involvement in average and as a result limits the extrapolation of findings. Second, 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. 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 and presents it by means of a concept board, thus further research should be conducted with other devices, considering different levels of immersion provided by devices and fans' preferences, ideally using the real equipment. Alongside with this, the present study does not consider the fact that a soccer match lasts at least 90 minutes, thus, further research should be conducted to assess users' perception of time and comfort while using the equipment.

Moreover, the present study assumes the experience is a broadcasting innovation and it does not address cannibalization issues regarding the real experience of attending the

stadium. Therefore, further research should be conducted to assess the potential cannibalization effects of VR soccer experience on the attendance to the stadium.

References

- Bagozzi, R.P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74–94. <https://doi.org/10.1007/BF02723327>
- Bargh, J.A., McKenna, K.Y.A., & Fitzsimons, G.M. (2002). Can you see the real me? Activation and expression of the “true self” on the internet. *Journal of Social Issues*, 58(1), 33–48. <https://doi.org/10.1111/1540-4560.00247>
- Barnard, M., Boor, S., Winn, C., Wood, C., & Wray, I. (2019). World in motion Annual Review of Soccer Finance 2019. *Deloitte Annual Review of Soccer Finance 2019*, 1–40.
- Carlson, B.D., Donavan, D.T., & Cumiskey, K.J. (2009). Consumer-brand relationships in sport: Brand personality and identification. *International Journal of Retail and Distribution Management*, 37(4), 370–384. <https://doi.org/10.1108/09590550910948592>
- Clark, J.S., Apostolopoulou, A., & Gladden, J.M. (2009). Real women watch soccer: Gender differences in the consumption of the NFL Super Bowl broadcast. *Journal of Promotion Management*, 15(1-2), 165-183.
- Davis, F.D., Bagozzi, R.P., & Warshaw, P.R. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, 35(8), 982–1003. <https://doi.org/10.1287/mnsc.35.8.982>
- Davis, F.D., Bagozzi, R. P., & Warshaw, P.R. (1992). Extrinsic and Intrinsic Motivation to Use Computers in the Workplace. *Journal of Applied Social Psychology*, 22(14), 1111–1132. <https://doi.org/10.1111/j.1559-1816.1992.tb00945.x>
- Deng, X., Unnava, H.R., & Lee, H. (2019). “Too true to be good?” when virtual reality decreases interest in actual reality. *Journal of Business Research*, <https://doi.org/10.1016/j.jbusres.2018.11.008>
- Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2019). The impact of virtual, augmented and mixed reality technologies on the customer experience. *Journal of Business Research*, 100, 547–560. <https://doi.org/10.1016/j.jbusres.2018.10.050>
- Hair, J.F., Hult, G.T.M., Ringle, C.M., & Sarstedt, M. (2013). *A Primer on Partial Least*

- Squares Structural Equation Modeling*. Los Angeles: SAGE Publications Inc.
<https://doi.org/10.1016/j.lrp.2013.01.002>
- Henseler, J., Hubona, G., & Ray, P.A. (2016). Using PLS path modeling in new technology research: Updated guidelines. *Industrial Management and Data Systems*, 116(1), 2–20.
<https://doi.org/10.1108/IMDS-09-2015-0382>
- Henseler, J., Ringle, C.M., & Sarstedt, M. (2014). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Holsapple, C.W., & Wu, J. (2007). User acceptance of virtual worlds. *Journal of Electronic Commerce Research*, 9(3), 231–242. <https://doi.org/10.1145/1314234.1314250>
- Jacobson, B. (2003). The social psychology of the creation of a sports fan identity: A theoretical review of the literature. *Athletic Insight*, 5(2), 1–14. Retrieved from <https://www.athleticinsight.com/Vol5Iss2/FanPDF.pdf>
- Jin, S.-A. A., & Bolebruch, J. (2009). Avatar-Based Advertising in Second Life. *Journal of Interactive Advertising*, 10(1), 51–60.
<https://doi.org/10.1080/15252019.2009.10722162>
- Jiang, P. (2019). Consumer adoption of mobile internet services: An exploratory study. *Journal of Promotion Management*, 15(3), 418–454.
- Ken Kwong-Kay Wong. (2013). Partial Least Squares Structural Equation Modelling (PLS-SEM) Techniques Using SmartPLS. *Marketing Bulletin*, 24. http://marketing-bulletin.massey.ac.nz/V24/MB_V24_T1_Wong.pdf
- Kim, D., & Ko, Y.J. (2019). The impact of virtual reality (VR) technology on sport spectators' flow experience and satisfaction. *Computers in Human Behavior*, 93, 346–356. <https://doi.org/10.1016/j.chb.2018.12.040>
- Kim, S.S., & Malhotra, N.K. (2005). A longitudinal model of continued IS use: An integrative view of four mechanisms underlying postadoption phenomena. *Management Science*, 51(5), 741–755. <https://doi.org/10.1287/mnsc.1040.0326>
- Kohler, T., Fueller, J., Stieger D., & Matzler, K. (2011). Avatar-based innovation: Consequences of the virtual co-creation experience. *Computers in Human Behavior*, 27(1), 160–168. <https://doi.org/10.1016/j.chb.2010.07.019>

- Kohler, T., Matzler, K., & Füller, J. (2009). Avatar-based innovation: Using virtual worlds for real-world innovation. *Technovation*, 29, 395–407.
<https://doi.org/10.1016/j.technovation.2008.11.004>
- Lee, H.H., Fiore, A.M., & Kim, J. (2006). The role of the technology acceptance model in explaining effects of image interactivity technology on consumer responses. *International Journal of Retail and Distribution Management*, 34(8), 621–644.
<https://doi.org/10.1108/09590550610675949>
- Lee, J., Kim, J., & Choi, J.Y. (2019). The adoption of virtual reality devices: The technology acceptance model integrating enjoyment, social interaction, and strength of the social ties. *Telematics and Informatics*.
<https://doi.org/10.1016/j.tele.2018.12.006>
- Liao, C.-H., Tsou, C.-W., & Shu, Y. (2008). The roles of perceived enjoyment and price perception in determining acceptance of multimedia-on-demand. *International Journal of Business and Information*, 3(1), 27–52.
- Litman, J.A. (2008). Interest and deprivation factors of epistemic curiosity. *Personality and Individual Differences*, 44(7), 1585–1595. <https://doi.org/10.1016/j.paid.2008.01.014>
- Loureiro, S.M.C., Guerreiro, J., Eloy, S., Langaro, D., & Panchapakesan, P. (2019). Understanding the use of Virtual Reality in Marketing: A text mining-based review. *Journal of Business Research*, 100, 514–530.
<https://doi.org/10.1016/j.jbusres.2018.10.055>
- Manis, K.T., & Choi, D. (2019). The virtual reality hardware acceptance model (VR-HAM): Extending and individuating the technology acceptance model (TAM) for virtual reality hardware. *Journal of Business Research*.
<https://doi.org/10.1016/j.jbusres.2018.10.021>
- Melnick, M.J. (1993). Searching for Sociability in the Stands: A Theory of Sports Spectating. *Journal of Sport Management*, 7(1), 44–60.
<https://doi.org/10.1123/jsm.7.1.44>
- REPUCOM. (2015). *Fan Revolution : Global fans in the information age. Who are we? What motivates us? How do we create value?* Retrieved from <http://nielsen.com/wp-content/uploads/2014/09/Fan-Revolution-2015.pdf>

- Rynarzewska, A. I. (2018). Virtual reality: a new channel in sport consumption. *Journal of Research in Interactive Marketing*, 12(4), 472–488. <https://doi.org/10.1108/JRIM-02-2018-0028>
- Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students* (5th ed.) Harlow: Pearson Education. <https://doi.org/10.1080/09523367.2012.743996>
- Shuv-Ami, A., Vrontis, D., & Thrassou, A. (2018). Brand lovemarks scale of sport fans. *Journal of Promotion Management*, 24(2), 215-232.
- Stavros, C., Meng, M.D., Westberg, K., & Farrelly, F. (2014). Understanding fan motivation for interacting on social media. *Sport Management Review*, 17(4), 455–469. <https://doi.org/10.1016/j.smr.2013.11.004>
- Suh, K.S., & Lee, Y.E. (2005). The effects of virtual reality on consumer learning: An empirical investigation. *MIS Quarterly: Management Information Systems*, 29(4), 673–697.
- Sun, H., & Zhang, P. (2006). The role of moderating factors in user technology acceptance. *International Journal of Human Computer Studies*, 64(2), 53–78. <https://doi.org/10.1016/j.ijhcs.2005.04.013>
- Thrassou, A., Vrontis, D., Kartakoullis, N.L., & Kriemadis, T. (2012). Contemporary marketing communications framework for soccer clubs. *Journal of Promotion Management*, 18(3), 278-305.
- Theodorakis, N.D., Wann, D.L., Nassis, P., & Luellen, T.B. (2012). The relationship between sport team identification and the need to belong. *Journal of Sport Management and Marketing*, 12, 25–38.
- Thompson, R.L., Higgins, C.A., & Howell, J.M. (1994). Influence of experience on personal computer utilization: Testing a conceptual model. *Journal of Management Information Systems*, 11(1), 167–187. <https://doi.org/10.1080/07421222.1994.11518035>
- Um, N.H. (2019). Antecedents and consequences of consumers' attitude toward social commerce sites. *Journal of Promotion Management*, 25(4), 500-519.

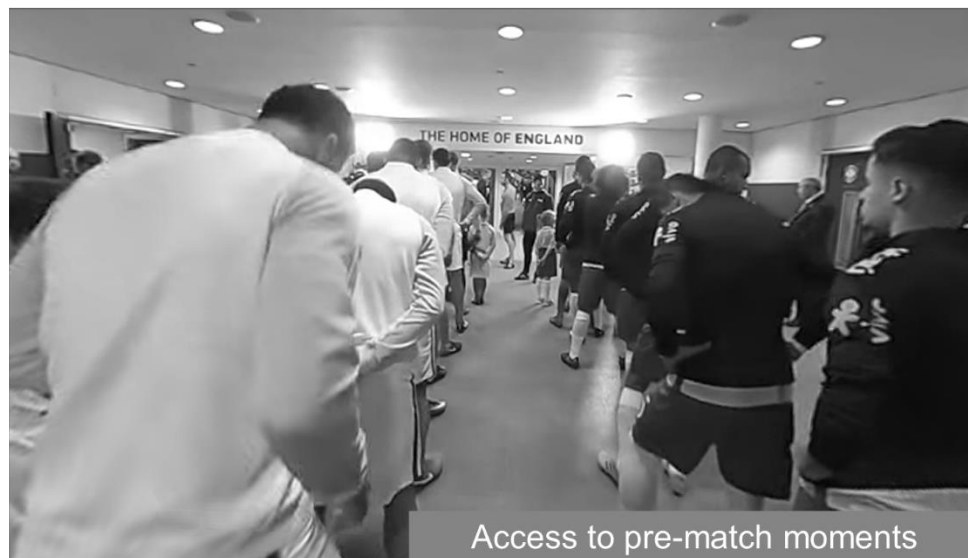
Appendix:

-Instructions to respondents:

This study intends to develop and test a new concept of a virtual reality experience (VR onwards) targeting soccer 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 is 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.

- Examples of images presented:





Adapted from: <https://www.vrnerds.de/oculus-quest-im-test-virtual-reality-fuer-die-masse/>; <https://www.youtube.com/watch?v=hVnB4kSaZDY&t=408s>; https://www.youtube.com/watch?v=RATDqAsJE_k

Figure 1 – Proposed model.

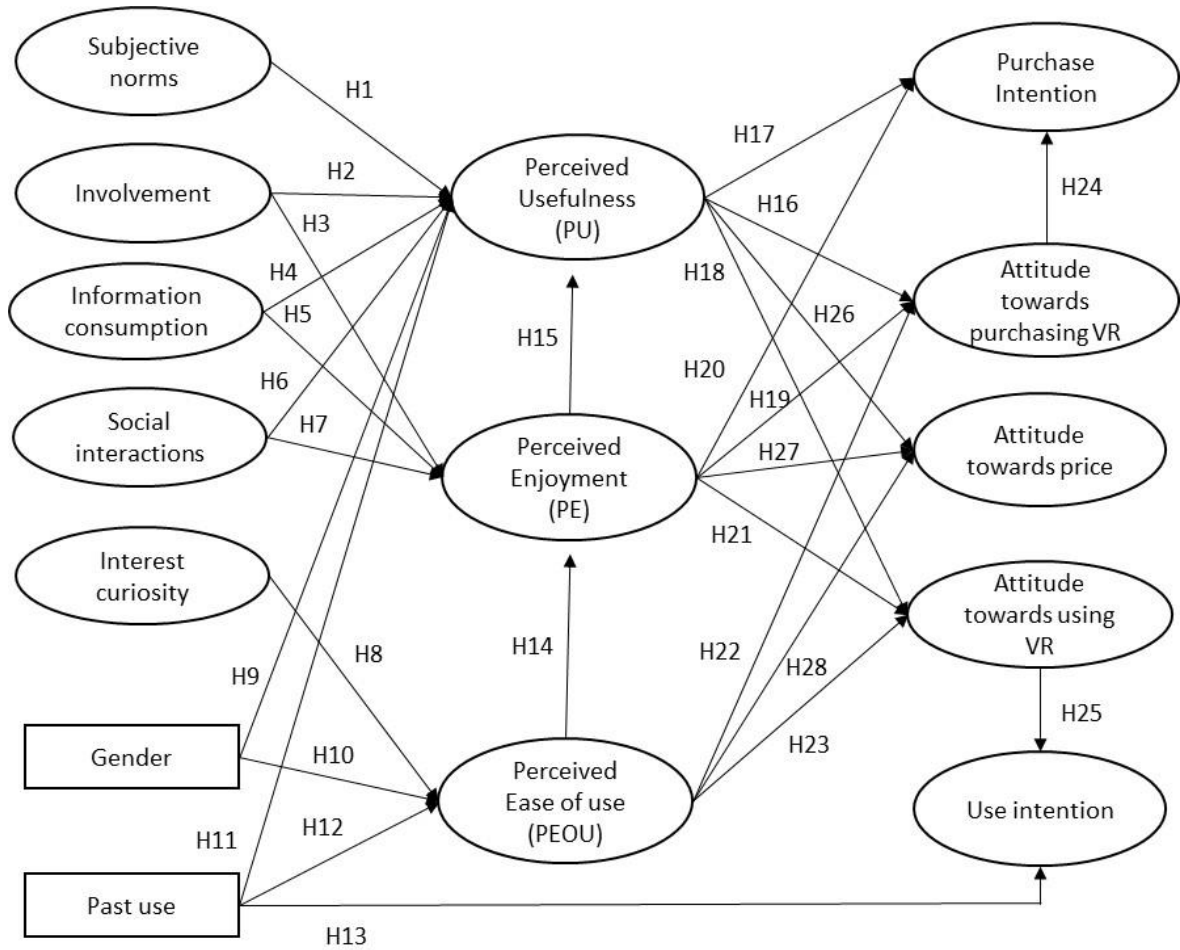


Table 1: List of measures

Construct	Measurement Indicators		Source:
Perceived Usefulness	PU1	Using VR equipment for the experience proposed would be useful for me.	Holsapple and Wu (2007); Manis and Choi (2019) Rynarzewska (2018)
	PU2	Using VR equipment would make my soccer watching experience more productive.	
	PU3	Using the VR equipment for the soccer 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.	Holsapple and Wu (2007); Lee, Kim and Choi (2019); Manis and Choi (2019)
	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.	Lee et al. (2019); Liao Tsou and Shu, (2008); Manis and Choi (2019)
	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 soccer games even if my favourite teams are not playing.	Liao, Tsou and Shu, (2008)
	Cur2	I am interested in learning about soccer.	
	Cur3	I like to search for soccer related information and content just out of curiosity.	
Subjective Norms	SN1	I believe my friends would be useful for the VR experience proposed.	Holsapple and Wu (2007)
	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 soccer information and content.	Wann, D. L. et al. (1996)
	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 soccer with others (eg: friends, family, acquaintances).	
Social Interactions	SI1	I find interesting that the experience allows me to communicate with other fans through voice.	Holsapple and Wu (2007); Lee et al. (2019)
	SI2	I find interesting that the experience allows me to interact with other fans.	
	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.	Rynarzewska (2018)
	IC2	I am constantly seeking information and content about soccer.	
	IC3	I seek soccer information and content while I am watching a match.	
	IC4	I seek soccer information when I am in my leisure time.	
Attitude Towards Purchasing VR Equipment To Get Access To The Experience Proposed	AP1	Negative-Positive	Manis and Choi (2019)
	AP2	Unsatisfactory-Satisfactory	
	AP3	Unfavourable-Favourable	
Attitude Towards Using VR Equipment To Get Access To The	AU1	Negative-Positive	Manis and Choi (2019)
	AU2	Unsatisfactory-Satisfactory	
	AU3	Unfavourable-Favourable	

Table 2 – Measurement model

Constructs	Measurement Indicators	Factor Loading	Mean	Standard Deviation	AVE	Composite Reliability	Cronbach's Alpha
Perceived Usefulness	PU1	0.89	4.69	1.47	0.70	0.88	0.87
	PU2	0.85	5.17	1.58			
	PU5	0.78	4.92	1.43			
Perceived Ease of Use	PEOU2	0.84	5.05	1.53	0.68	0.90	0.90
	PEOU3	0.84	4.05	1.81			
	PEOU4	0.82	4.50	1.25			
	PEOU5	0.80	4.83	1.20			
Perceived Enjoyment	PE1	0.84	5.13	1.42	0.77	0.93	0.93
	PE2	0.89	5.73	1.21			
	PE3	0.83	4.55	1.62			
	PE4	0.94	5.32	1.38			
Curiosity	Cur1	0.75	3.97	1.80	0.73	0.89	0.89
	Cur2	0.89	4.37	2.13			
	Cur3	0.93	4.38	1.73			
Subjective Norms	SN1	0.86	5.24	1.41	0.68	0.89	0.90
	SN2	0.77	4.85	1.54			
	SN3	0.80	4.76	1.63			
	SN4	0.87	5.19	1.56			
Involvement	Involv3	0.91	4.07	1.86	0.74	0.92	0.92
	Involv4	0.89	5.61	1.35			
	Involv5	0.81	4.94	1.89			
	Involv6	0.81	4.79	1.80			
Social Interactions	SI1	0.79	5.19	1.28	0.67	0.86	0.86
	SI2	0.88	4.95	1.43			
	SI3	0.78	5.33	1.41			
Information Consumption	IC1	0.85	4.61	1.53	0.59	0.85	0.86
	IC2	0.73	4.06	1.86			
	IC4	0.76	3.24	1.66			
	IC5	0.73	4.26	1.84			
Attitude towards purchasing	AP1	0.94	4.91	1.48	0.86	0.95	0.95
	AP2	0.94	5.03	1.53			
	AP3	0.90	4.49	1.57			
Attitude towards using	AU1	0.91	5.18	1.55	0.72	0.95	0.95
	AU2	0.95	5.56	1.39			
	AU3	0.90	4.76	1.46			
	AU4	0.85	5.58	1.22			
	AU5	0.68	3.90	1.61			
	AU6	0.85	5.56	1.15			
	AU7	0.81	5.29	1.16			
Purchase Intention	PI1	0.88	4.55	1.76	0.75	0.94	0.94
	PI2	0.82	4.14	1.75			
	PI3	0.84	3.25	1.72			
	PI4	0.94	4.43	1.62			
	PI5	0.87	4.90	1.70			
Using Intention	UI1	0.89	5.10	1.78	0.82	0.95	0.95
	UI2	0.97	4.71	1.84			
	UI3	0.94	3.73	1.77			
	UI4	0.83	5.16	1.66			

Table 3 - Results of the estimation of the structural equation model.

Hypothesis	Standardized Path Coefficients	t-Value	Result
H1: Subjective Norms → PU	0.10 *	2.44	Accepted
H2: Involvement → PU	1.28 **	3.24	Accepted
H3: Involvement → PE	-1.04	2.61	Rejected
H4: Information Consumption → PU	-1.20	1.99	Rejected
H5: Information Consumption → PE	1.04 *	2.37	Accepted
H6: Social Interactions → PU	0.19 *	2.44	Accepted
H7: Social Interactions → PE	0.68 ***	8.32	Accepted
H8: Curiosity → PEOU	0.22 **	3.24	Accepted
H9: Gender → PU	0.02	1.47	Rejected
H10: Gender → PEOU	0.09	1.62	Rejected
H11: Past Use → PU	0.11	1.71	Rejected
H12: Past Use → PEOU	0.61 ***	11.61	Accepted
H13: Past Use → Use Intention	0.24 ***	4.44	Accepted
H14: PEOU → PE	0.10 ***	4.19	Accepted
H15: PE → PU	0.73 ***	5.84	Accepted
H16: PU → Attitude Purchase	0.82 ***	5.95	Accepted
H17: PU → Purchase Intention	0.81 ***	4.07	Accepted
H18: PU → Attitude Use	0.55 ***	5.81	Accepted
H19: PE → Attitude Purchase	0.15 ***	3.43	Accepted
H20: PE → Purchase Intention	-0.30	0.83	Rejected
H21: PE → Attitude Use	0.34 ***	6.00	Accepted
H22: PEOU → Attitude Purchase	-0.05	0.71	Rejected
H23: PEOU → Attitude Use	0.07 *	2.41	Accepted
H24: Attitude Purchase → Purchase Intention	0.37 ***	4.67	Accepted
H25: Attitude Use → Use intention	0.65 ***	10.23	Accepted
H26: PU → Attitude towards price	0.70 ***	4.09	Accepted
H27: PE → Attitude towards price	-0.32	0.75	Rejected
H28: PEOU → Attitude towards price	0.15 *	2.50	Accepted

*p-value < 0.05; **p-value < 0.01; ***p-value < 0.001