Unleashing the power of experiences: The catalytic role of app technologies in unlocking consumers behaviours in sports

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DOCTORAL THESIS

Title	Unleashing the power of experiences: The catalytic role of app technologies in unlocking consumers behaviours in sports
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Abstract

This thesis examines how technology shapes user experiences and influences consumer behaviours in the sports industry. Through a focused exploration of three distinct technological contexts, it seeks to shed light on the relationship between technological advancements and their effects on consumers' interactions with sports brands and organisations.

The first study investigates the role of gamification in sports-related apps, exploring how game-like features can enhance brand engagement. It looks at how these gamified experiences encourage brand loyalty and the intention to continue using the app. The goal is to move beyond the basic understanding of gamification mechanics and dynamics to reveal how they can be strategically applied to foster deeper customer-brand connections.

The second study shifts attention to information apps at sporting events, analysing how these platforms deliver real-time data and influence participants' behaviours. It delves into users' cognitive and emotional responses to event information, aiming to identify effective ways information apps can enhance attendees' commitment to the event, increase place attachment, and motivate future behaviours.

The third study enters the field of esports, examining the dual processes of conscious and unconscious cognition in shaping players' behaviours. This investigation particularly focuses on understanding how engagement in esports not only captivates participants but also how it might lead to the formation of potentially harmful habits. By exploring these cognitive processes, the study seeks to uncover the darker aspects of technology use within esports, highlighting its potential to foster negative behaviours among consumers. This exploration is crucial as it provides insights into how the gameful nature of digital games can sometimes lead to excessive gaming behaviours, underscoring the need for a balanced approach to gaming practices within the industry.

Overall, this thesis aims to provide a clearer picture of how technologies redefine users’ experiences within the sports industry and shape their behaviours towards the different sports brands. It seeks to offer valuable insights for industry professionals, policymakers, and academics, guiding the development of future technologies and

deepening understanding of the dynamic interaction between humans and digital systems in the sports sector.

Keywords: Technology, Gameful experience, Event experience, Esports experience, Consumer behaviours.

Resumen

Esta tesis doctoral examina cómo la tecnología influye en las experiencias de los usuarios y en los comportamientos de los consumidores en el contexto de practicantes de deporte y la industria asociada. A través de tres estudios, en contextos tecnológicos distintos, esta tesis muestra la relación entre el desarrollo de la tecnología y sus efectos en las interacciones de los consumidores con las marcas y organizaciones deportivas.

El primer estudio investiga el uso de la gamificación en aplicaciones relacionadas con el deporte, explorando cómo la utilización de elementos de gamificación puede contribuir a incrementar la vinculación del cliente con las marcas. En concreto, este estudio examina cómo estas experiencias gamificadas fomentan la lealtad hacia la marca y la intención de continuar utilizando la aplicación. El objetivo es ir más allá de la comprensión básica de la mecánica y dinámicas de gamificación para revelar cómo puede aplicarse estratégicamente la gamificación para fomentar conexiones más profundas entre cliente y marca.

El segundo estudio tiene como objetivo las aplicaciones de información en eventos deportivos, analizando cómo estas plataformas ofrecen datos en tiempo real a sus usuarios e influyen en el comportamiento de los participantes hacia la aplicación, el evento deportivo y el destino turístico. Este estudio profundiza en las respuestas cognitivas y emocionales de los usuarios ante la información del evento, con el objetivo de identificar maneras efectivas en que las aplicaciones de información pueden aumentar el compromiso de los participantes en el acontecimiento deportivo, incrementar el apego al lugar, como destino turístico, y motivar comportamientos futuros.

El tercer estudio se centra en los usuarios de juegos deportivos digitales, examinando los procesos cognitivos duales, consciente e inconsciente, en la configuración de los comportamientos de los jugadores. Esta investigación se enfoca particularmente en entender cómo el compromiso de los jugadores de juegos deportivos digitales, no solo cautiva a los participantes, sino también cómo podría llevar a la formación de hábitos potencialmente dañinos. Al explorar estos procesos cognitivos, el estudio busca descubrir los aspectos más oscuros del uso de la tecnología dentro de los juegos

deportivos digitales, destacando su potencial para fomentar comportamientos negativos entre los consumidores. Esta exploración es crucial, ya que proporciona información sobre cómo la naturaleza lúdica de los juegos digitales a veces puede llevar a comportamientos de juego excesivos, subrayando la necesidad de un enfoque equilibrado en las prácticas de juego dentro de la industria.

En general, esta tesis pretende proporcionar nuevos hallazgos de cómo las tecnologías redefinen las experiencias de los usuarios dentro de la industria deportiva y moldean sus comportamientos hacia las distintas marcas deportivas. Busca ofrecer perspectivas valiosas para profesionales de la industria, responsables de políticas y académicos, guiando el desarrollo de las futuras tecnologías para profundizar en la comprensión de la interacción dinámica entre humanos y sistemas digitales en el contexto deportivo.

Palabras clave: Tecnología, Experiencia lúdica, Experiencia de eventos, Experiencia de deportes electrónicos, Comportamientos del consumidor.

Resum

Aquesta tesi doctoral examina com la tecnologia modela les experiències dels usuaris i influeix en els comportaments dels consumidors i practicants d'esports i la indústria associada. La tesi desenvolupa tres estudis, en tres contextos tecnològics diferents, tot analitzant la relació entre els avenços tecnològics i els seus efectes en les interaccions dels consumidors amb les marques i organitzacions esportives.

El primer estudi investiga l'ús de la gamificació en aplicacions relacionades amb l'esport, tot explorant com les experiències gamificades fomenten la lleialtat cap a la marca i la intenció de continuar utilitzant l'aplicació. L'objectiu és anar més enllà de la comprensió bàsica de la mecànica i dinàmiques de gamificació per explicar com poden aplicar-se estratègicament per tal de fomentar connexions més profundes entre client i marca.

El segon estudi aprofondeix en les aplicacions d'informació en esdeveniments esportius, tot analitzant com aquestes plataformes mostren dades en temps real i influeixen en el comportament dels participants envers l'aplicació, l'esdeveniment esportiu i la destinació turística. L'estudi aprofondeix en les respostes cognitives i emocionals dels usuaris davant la informació de l'esdeveniment, amb l'objectiu d'identificar maneres efectives en què les aplicacions d'informació poden augmentar el compromís dels participants en l'esdeveniment esportiu, incrementar l'afecte cap al lloc, com a destinació turística, i motivar comportaments futurs.

El tercer estudi se centra en els usuaris de jocs esportius digitals, tot examinant els processos duals cognitius,conscients i inconscients, en la configuració dels comportaments dels jugadors. Concretament, aquesta investigació se cenyeix en comprendre com la implicació dels jugadors d'esports digitals, no només els sedueix , sinó també com els podria conduir a la formació de hàbits potencialment nocius. En explorar aquests processos cognitius, l'estudi busca descobrir els aspectes més foscos de l'ús de la tecnologia en els jocs esportius digitals, tot destacant el seu potencial per fomentar comportaments negatius entre els consumidors. Els resultats són rellevants atès que proporciona les percepcions sobre com la naturalesa lúdica dels jocs digitals de vegades pot portar a comportaments de joc excessius, tot

subratllant la necessitat d'un enfocament equilibrat en les pràctiques de joc dins de la indústria.

En general, aquesta tesi pretén proporcionar noves troballes sobre com les tecnologies redefineixen les experiències dels usuaris dins de la indústria esportiva i modelen els seus comportaments cap a les diferents marques esportives. Busca oferir perspectives valuoses per a professionals de la indústria, responsables de polítiques i acadèmics, tot guiant el desenvolupament de les futures tecnologies per tal d'aprofundint en la comprensió de la interacció dinàmica entre humans i sistemes digitals en el context dels esports.

Paraules clau: Tecnologia, Experiència lúdica, Experiència d'esdeveniments, Experiència d'esports electrònics, Comportaments del consumidor.

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%	Per Cent
AB (I)	Absorption
ABS (III)	Absorption
ACT (I)	Brand Activation
ACT (III)	Activation
ADD	Addictive Use
AET	Affective Events Theory
AFF	Affection
ANA	Absence Of Negative Affect
App	Application
APPACT	App Activation
ATT	Place Attachment
AVE	Average Variance Extracted
BI	Behavioural Intentions
CBE	Customer-Brand Engagement
COM	Affective Commitment
CP	Cognitive Processing
CR	Composite Reliability
CT	Creative Thinking
DEP	Dependance
DOM	Dominance
ENJ	Enjoyment
ENJ_APP	App Enjoyment
ENJ_EV	Event Enjoyment
ESC	Escapism
EV_EXP	Event Experience
eWOM	Electronic Word of Mouth
FIFA	Fédération Internationale De Football Association

GAMEX	Gameful Experience
HAB	Habit Formation
HTMT	Heterotrait – Monotrait
ID	Identity
INT	Intention To Use
LEAR	Learning
LOY	Brand Loyalty
MC	Multidimensional Construct
MICE	Meetings, Incentives, Conferences, And Exhibitions
PENJ	Perceived Enjoyment
PEOU	Perceived Ease of Use
PIV	Perceived Information Value
PLS – SEM	Partial Least Squares Structural Equation Modelling
PO	Psychological Ownership
PU	Perceived Usefulness
R^2	R Squared
SAT_APP	App Satisfaction
SE	Seeking Excellence
SIC	Self-Image Congruity
SOR	Stimulus – Organism – Response
SRD	Self-Regulation Deficiency
SRMR	Standardised Root Mean Square Residual
VIF	Variance Inflation Factor
WOM	Word Of Mouth

Chapter 1:

1. Introduction

Chapter 1 is an introduction to the doctoral thesis, the literature background, the structure, and content.

1.1. Digital engagement technologies in the sports industry

In the digital age, the emergence of digital technologies has significantly reshaped the landscape of users' experiences. These technologies, encompassing a broad spectrum from social media platforms to mobile apps and interactive web services, have redefined the ways in which users interact with digital content. The core of this transformation lies in the technologies' ability to facilitate interactive, immersive, and highly personalised experiences, noticeably elevating user engagement, satisfaction, and loyalty (Baskerville and Myers, 2023). As such, understanding the impact of digital technologies on users' experiences is crucial for navigating the digital landscape effectively, both from a user-centric and a designer's perspectives.

The sports industry has been particularly impacted by this shift, with the integration of digital technologies opening new opportunities for sports practitioners and enthusiasts to engage with their favourite brands and services (Deloitte, 2018; Glebova *et al.*, 2022; Santomier *et al.*, 2023). Specifically, the use of apps' technologies in sports was estimated to bring close to US$4 billion in revenue to this industry in 2022. This covered a mix of advertising income (US$2.47 billion), paid-app purchases (US$188 million), and in-app purchases (US$1.29 billion) (N3XT Sports, 2022), emphasising the opportunities awaiting sports entities leveraging apps to personalise their consumers' experiences.

For this reason, several brands launched their own apps to serve different segments such as athletes, coaches, sports enthusiasts, and esports gamers, spanning from training and performance analysis tools to fans engagement platforms and competitive esports environments. This diversity in application types caters to a wide range of needs and preferences, facilitating enhanced experiences, performance improvement, and deeper fan connections with sports brands and events. These applications have the potential to revolutionise the way users experience sports, offering them a more immersive and exciting journey (Shalimov, 2022).

Table 1.1. Types of sports apps, their target audiences, and purpose

Type	Target	Purpose
Training and performance	Athletes / Coaches	Provide data-driven insights into performance metrics
Fan engagement apps	Fans	Create a sense of community and enhance fan experiences with interactive content
Esports platforms	Games / Spectators	Competitive gaming environment for players; entertainment and community for spectators
Live streaming apps	Fans	Broadcast live sports events for remote viewing
Sports fitness apps	Athletes / General Public	Track fitness progress, provide workout routines, and nutritional advice
Sports quiz apps	Fans / General Public	Test sports knowledge and engage users with trivia
Sports games apps	Gamers / Sports Fans	Offer interactive sports-themed gaming experiences
Sports news and analysis apps	Fans / Analysts	Deliver the latest sports news, analyses, and updates
Ticket sales apps	Event Attendees	Simplify the process of purchasing tickets for sports events

Sports events booking apps	Event Attendees	Enable booking of events, including matches and experience packages
AR/VR sports apps	Fans / Athletes	Provide immersive experiences for training or fan engagement through AR/VR technologies
Sports betting apps	Bettors	Facilitate sports betting with real-time odds, betting options, and payouts
Fantasy sports apps	Fans / Gamers	Allow users to create and manage fantasy sports teams, compete in leagues

Source: Created by authors.

All in all, these various specialised apps cater to sports enthusiasts' diverse interests and needs. For instance, training and performance apps have been offering athletes and coaches data-driven insights into performance metrics, enabling personalised training regimes and performance optimisation (Bodemer, 2023). Conversely, fan engagement apps have been creating a sense of community among sports fans through live updates, interactive content, and social features, fostering a deeper connection with their favourite teams (Kharmalki and Raizada, 2020; Vale and Fernandes, 2017). Furthermore, competitive esports platforms have emerged as a new frontier in sports, offering gamers and spectators a digital arena for competitive play and viewership (Watanabe *et al.*, 2022). On the other hand, live streaming apps have been catering to sports fans who prefer to watch games from the comfort of their own spaces, offering multiplatform live streaming services with chat options and provide live scores, game results, and performance updates, ensuring fans are always in the loop (Chou *et al.*, 2022). Additionally, sports fitness apps have emerged as essential tools for individuals to enhance their physical well-being, offering tailored workout and nutrition plans (Hu *et al.*, 2023). For those looking to test their sports knowledge, sports quiz apps provide a fun and interactive way to learn and compete

with others (Armentrout *et al.*, 2021). Sports game apps immerse users in virtual competitions, replicating the thrill of real-world sports in a digital format (Bitrián *et al.*, 2020). Meanwhile, sports news and analysis apps keep fans up to date with their favourite sports' latest developments, scores, and expert insights (Shalimov, 2022). Ticket sales and sports events booking apps streamline the process of securing a spot at coveted events, making it easier for fans to participate in live sports experiences (He, 2022; Rizvandi *et al.*, 2019). Innovations in AR/VR sports apps offer unprecedented immersion, allowing users to experience sports in new and engaging ways, from virtual attendance at events to enhanced training sessions (Lee and Oh, 2022; Neumann *et al.*, 2017). For those inclined towards gambling, sports betting apps provide a secure platform for wagering on outcomes (Hing *et al.*, 2022). In contrast, fantasy sports apps engage users in creating and managing teams, adding a strategic layer to sports fandom (Gupta *et al.*, 2024).

1.2. Revolutionising the sports industry: Five key technological pillars shaping the future

According to the Global Sports Innovation Centre by Microsoft (GSIC) (2019), the technological future of sports will be shaped by five key pillars: The development of smart venues, improved sports consumers' engagement, enhanced teams and athletes' performance, increased business insights and productivity, and a rise of esports:

- **Smart venues**: Sports venues are embracing technological innovations to enhance fan attraction and stay competitive against alternative entertainment options like in-home game viewing and video games. The three foremost innovations in intelligent venues include leveraging big data for comprehensive consumer insights, introducing digital platforms for generating automated personalised content and enhancing in-stadium connectivity (Zhang *et al.*, 2023). These digital platforms enrich the fan experience at various touchpoints, both within and outside the venue, by streamlining stadium accessibility and enhancing the fan journey (Portet, 2016). Furthermore, sports organisations increasingly utilise big data and digital advancements to monitor consumer behaviours, decode preferences, and provide additional value-added services.

This is a significant shift towards a more personalised and engaging sports experience (GSIC, 2019).

- **Sports consumers' engagement**: Engaging sports consumers poses a significant challenge for the sports industry, primarily due to their shorter attention spans and increasing expectations for personalised and unique experiences (Yoshida *et al.*, 2014). By collecting data, sports organisations can better understand and adapt to the shifting preferences of younger generations, enabling them to target these individuals more effectively and respond swiftly to their evolving needs (Andrews and Ritzer, 2018). To enhance their engagement, sports entities are turning to digital solutions that offer exclusive experiences that are not purchasable with money (Pandey and Hassan, 2021). The top three digital solutions expected to drive this engagement include digital platforms for personalised content creation and fostering positive relationships with these individuals, access to real-time and static statistics, and geolocation services that enhance their experiences.
- **Teams and athletes' performance**: Technology is set to play a crucial role in enhancing sports performance, with wearable technologies and sensors at the forefront, providing valuable performance metrics to create detailed player profiles accessible to relevant professionals (Aroganam *et al.*, 2019). The global market for fitness trackers is anticipated to achieve revenues of US$74.61 billion by 2024. With an expected annual growth rate (CAGR) of 8.47% from 2024 to 2028, the market size is forecasted to expand to US$103.30 billion by the end of 2028 (Statista, 2024). Therefore, tools for gathering biometric data will be instrumental in optimising athlete welfare by tailoring training to individual needs, thus preventing injuries and supporting recovery (Li *et al.*, 2015). Additionally, data analytics will significantly improve performance for athletes and teams, both on and off the field (McDevitt *et al.*, 2022). Real-time data collection during matches will offer coaches insights into team dynamics, aiding in strategic decision-making. At the same time, post-game analysis will allow for the adjustment of training sessions based on identified trends, thereby elevating overall athletic performance (Rigozzi *et al.*, 2022).

- **Business insights and productivity**: Sports organisations must adopt technology to capitalise on new opportunities to stay competitive amidst the industry's digital upheaval. A key growth driver will be using business data analytics and artificial intelligence, including machine learning, to refine data analysis processes. These technologies will streamline data collection, selection, and processing, highlighting valuable insights and identifying trends to inform strategic decisions (Liu *et al.*, 2021; Nalbant and Aydin, 2022). In line with this, 76% of sports entities are planning increased investments in analytics to facilitate the offering of customised experiences (Deloitte's Outlooks, 2024).
- **The Rise of eSports**: The eSports industry has witnessed remarkable growth in recent years in terms of business scale and consumer engagement, with expectations set for continued expansion (Newman *et al.*, 2020). Transitioning from a niche to a mainstream phenomenon, the esports audience has grown to an estimated 532 million globally, with revenues exceeding 1.38 billion dollars in 2022 and projected to reach 2.70 billion dollars by 2028, indicating a significant surge in both participation and commercial interest (Newzoo's Global Esports Market Report, 2022). This shift towards a digital culture draws sponsorships and leads to marketing innovations, including in-game advertising and brand collaborations, requiring marketers and executives to evolve alongside this trend. The popularity of eSports has led to the development of new league and competition formats to widen the audience further. While eSports begin to bridge the monetisation gap with traditional sports leagues, enhancing revenue streams remains a future priority, underscoring the dynamic and rapidly evolving nature of the eSports landscape.

This exploration of the five key technological pillars highlights the transformation within the sports industry. From integrating smart venue technologies to the rapid growth of esports, these innovations are redefining how sports are consumed and experienced and setting the stage for further advancements. As we continue to delve into these dynamic changes, the subsequent section will focus on identifying specific research gaps within these technological integrations. This will help clarify where further investigation and development are needed to optimise these technologies fully, ensuring they

meet the evolving demands of consumers and contribute effectively to the sports industry's future growth.

1.3. Technological transformations in sports: Identifying the research gaps

As the sports industry continues to evolve and expand, staying abreast of emerging trends is crucial for maintaining a competitive edge. Gamification, event apps, and gameful experiences in esports represent innovative approaches that align perfectly with the current trajectory of digital transformation and consumer engagement in sports. These digital engagement technologies have garnered significant attention for their unique ability to engage users.

For example, gamification in sports apps has emerged as a powerful tool to enhance user engagement, motivation and loyalty. By integrating game elements into sports applications, developers aim to create a more interactive and enjoyable user experience (Habachi *et al.*, 2023; Lister *et al.*, 2014). Research suggests that gamification can positively impact users' behaviours by increasing intrinsic motivation and satisfaction (Lister *et al.*, 2014; Rajani *et al.*, 2023). Additionally, gamification has been associated with improved health behaviours, such as increased physical activity and smoking cessation (Rajani *et al.*, 2023). Additionally, gamification strategies often include challenges, rewards, and progress tracking to motivate users to stay active and engaged (Bitrián *et al.*, 2020; Esmaeilzadeh, 2021). These elements enhance user experiences and contribute to increased adherence to exercise programs (Bitrián *et al.*, 2020). Moreover, the design and implementation of gamification elements play a crucial role in determining their impact on user behaviour and engagement (Esmaeilzadeh, 2021). Considering this prior research, a significant portion of the literature has concentrated on the mechanics of gamification rather than delving into the emotional interplay between users and gamified systems. Overall, gamification in sports apps offers a promising approach to driving users' engagement, motivation, and loyalty. However, the nuanced emotional connections that develop during the gameful experience and their subsequent impact on users' behaviours still need to be explored. This gap in understanding the depth of emotional engagement within gamified environments and its influence on behaviours is a central gap our research aims to address. By shifting focus to the emotional dynamics at play, our study explores how

these affective interactions contribute to the broader behavioural outcomes of gamified app usage.

Similarly, event apps in the sports industry are essential for enhancing user engagement and participation in various sporting activities. These apps serve multiple purposes, including promoting and organising sports events, providing users with the necessary information, providing organisers with business insights, facilitating registration, and enabling participant interaction (Dallinga *et al.*, 2015; Janssen *et al.*, 2017). Research indicates that event apps cater to a diverse range of users, with factors such as age, fitness level, and event distance influencing their usage patterns (Bitrián *et al.*, 2020; Pobiruchin *et al.*, 2017) and enhancing their performance (Frevel *et al*., 2022; Liu *et al*., 2023). Additionally, research has predominantly examined wearable technologies in isolation, concentrating on how these devices influence specific users' behaviours without considering the integrated experience of the event (Rigozzi *et al.*, 2022). These studies have focused narrowly on the functional aspects of app technologies, often overlooking the holistic impact these digital interactions have on the user's overall experience and subsequent behaviours. In linking technology with event experiences, this thesis aims to bridge the gap in the literature by examining the interplay between these two factors, thereby offering a more comprehensive understanding of their collective impact on users' behaviours.

Comparably, esports have garnered significant interest due to the increasing popularity of organised competitive gaming (Hamari and Sjöblom, 2017; Reitman *et al.*, 2020). Research on esports has delved into factors influencing viewership, player motivations, and the impact of gamification on engagement (Bányai *et al.*, 2020; Xiao, 2019). Studies have indicated that viewers appreciate the suspense and drama in esports games, which are fundamental values associated with the esports viewing experience (Xiao, 2019). Additionally, fame, fortune, and fun motivate individuals to engage in esports and create content on video platforms (Törhönen *et al.*, 2019). Esports' competitive and social elements foster a sense of community and social connectedness among players and viewers (Shan *et al.*, 2023).

Furthermore, gamification elements in esports have been shown to enhance viewer engagement and loyalty (Qian, 2023; Qian *et al.*, 2022). Gamification strategies, such as challenges, rewards, and interactive features, are pivotal in creating immersive and

rewarding experiences for esports enthusiasts. These elements boost user engagement and enhance the overall enjoyment and satisfaction derived from esports events. Additionally, researchers have examined the health implications of esports, both mental and physical (Kelly and Leung, 2021; Macey and Hamari, 2019). However, despite the growing research in this area, there still needs to be an understanding of the unique experiential aspects of esports and their effects on players' well-being. This oversight extends to the exploration of esports' potential addictive behaviours and the development of preventative guidelines. Acknowledging this, our thesis critically examines the experiential dimensions of esports, aiming to shed light on the psychological impacts and well-being of players (Abbasi *et al*., 2023; Ramella-Zampa *et al*., 2022).

1.4. The research objectives of this dissertation

This dissertation aims to enhance the understanding of how technologies influence users' experiences and shape their behaviours in the sports industry. It seeks to explore how consumers interact with the different digital engagement technologies through apps and devices and use their experiences in decision-making processes. More narrowly, this dissertation pursues the following research objectives.

First, this dissertation aims to delve into the impact of gamification on consumers' behaviours in sports, specifically focusing on the gameful experience in the context of sports and fitness gamified branded apps. The purpose is to explore the dimensions through which gameful experiences influence consumers behaviours and drive different behavioural outcomes. More specifically, it seeks to:

- Examine the psychological processes and users' gameful experiences that underpin gamification and its impact on users' engagement.
- Assess the comprehensive impact of gameful experiences on users' attitudes towards the brand and its gamified app, focusing on brand loyalty and continued app usage.
- Explore the role of personal factors such as self-image congruity in moderating the effects of gameful experiences on marketing outcomes.

By achieving these objectives, this research seeks to contribute to the broader understanding of how gamification can be leveraged to enhance customer-brand

engagement and different behavioural outcomes in the sports industry. Employing the stimulus-organism-response (SOR) model (Mehrabian and Russell; 1974), it investigates the interplay between gameful experiences (stimulus), brand engagement (organism), and the consequent brand loyalty and app usage intentions (response), with a particular focus on the moderating role of SIC with sports. This exploration is poised to offer insightful contributions to the marketing field, particularly in strategizing digital engagements and fostering sustained consumers relationships.

Second, the purpose of this dissertation is to also explore how technology, specifically mobile event apps, has transformed the organisation and experience of events in the sports industry, with a particular focus on the cycling field. The study aims to understand how the technological features of event-related apps could enhance participants' experiences and lead to positive outcomes, such as increased satisfaction, commitment, and engagement. More specifically, it seeks to:

- Examine the features of event apps and their impact on users' satisfaction.
- Investigate how users' satisfaction with the app impact their overall event experiences and behavioural outcomes.
- Analyse the outcomes of the relationship between app satisfaction and effective event experiences. Outcomes such as a more substantial affective commitment, behavioural intentions, and place attachment.

To achieve these objectives, the dissertation proposes a comprehensive research model that connects app technology with event experiences. It seeks to extend the Technology Acceptance Model (TAM) (Davis, 1989) to include factors such as the perceived ease of use, perceived usefulness, perceived information value, and enjoyment of the app, specifically in the context of sports events. Furthermore, the study aims to examine the effect of app satisfaction on effective event experiences, potentially leading to stronger affective commitment, behavioural intentions, and place attachment. This research contributes to a deeper understanding of the role of event apps in the sports industry and offers valuable insights for event organisers, technology providers, and researchers by highlighting the importance of leveraging app technology to enhance participants' experiences.

Third, this dissertation aims to explore the impact of esports experiences on players. It focuses on examining the psychological effects of esports participation on players' behaviours and well-being, with a focus on the risk of addictive behaviours. More specifically, it seeks to:

- Provide a comprehensive understanding of the experiential aspects of esports and their effects on players' psychological health.
- Investigate the specific impact of esports on addictive behaviours and identify primary risk factors associated with such behaviours.
- Examine the cognitive and affective processes underlying problematic gaming behaviours within the esports context.

The study aims to fill these gaps by proposing a novel research model that analyses the pathways through which esports experiences lead to excessive behaviours, using the dual-system theory (Kahneman, 2011) to differentiate between cognitive and affective processes. This model intends to dissect the gameful experience in esports, highlighting the roles of psychological ownership and seeking excellence in gaming. These aspects are examined for their potential contributions to habit formation, self-regulation deficiencies, and addictive usage patterns. By achieving these objectives, the research contributes to a deeper understanding of the complex cognitive and affective processes that drive problematic gaming behaviours in the esports context. This investigation not only broadens the scope of esports literature but also lays the groundwork for future initiatives designed to improve player well-being and promote responsible gaming practices.

1.5. Overview and structure of the dissertation

This dissertation unfolds across three empirical studies, each examining the relationship between sports consumers' experiences with emergent technologies and their resulting behaviours. Focused on gamification, events apps, and esports, these studies jointly endeavour to articulate the implications of technology-mediated consumer interactions for marketers and policymakers. While traversing distinct technological landscapes—from gameful experiences' role in driving users' engagement (Habachi *et al*., 2023; Koivisto and Hamari, 2019) to the enriching capabilities of event apps (Talantis *et al.*, 2020) and the psychological dynamics of esports (Abbasi *et al.*, 2023)—the collective aim is to explain the impact of these digital

interactions on consumers' behaviours, through their experiences with the technology. This initiative aligns with the pressing call for marketing research to expand our comprehension of the consumer behaviours elicited by technological interfaces (Hervé *et al*., 2021; Plangger *et al*., 2022). Table 1.2 summarises this dissertation's three empirically focused studies, each tailored to a specific context.

The subsequent section delves into the details of the three studies, outlining how each contributes to the overarching objective of the thesis and provides a synopsis of their findings. Following this introductory overview, the complete studies are presented in Chapters 2, 3, and 4. Chapter 5 wraps up the thesis by summarising the key conclusions and discussing both the theoretical and practical implications for marketing researchers, industry professionals, and policymakers. Additionally, this chapter includes a critical examination of the research, highlighting its principal limitations and proposing directions for future studies that could advance consumer research within the context of emergent technologies.

The initial study, addressing the thesis' first objectives, is introduced as follows:

Study 1: Gamify, engage, build loyalty: exploring the benefits of gameful experience for branded sports apps

This first paper explores the effects of gamification—specifically, the gameful experience—on users' engagement, brand loyalty, and behavioural intentions towards sports-related branded mobile apps. Drawing upon the stimulus-organism-response (SOR) theoretical model, the research delineates how these gameful experiences act as a stimulus influencing both the psychological engagement of consumers with the brand (organism) and their subsequent loyalty and usage intentions (response). Moreover, it delves into the nuanced roles of customer-brand engagement (CBE) as a mediator and self-image congruity (SIC) as a moderator within these dynamics.

The study unveils that while gameful experience directly impacts users' intentions to engage with the app, its impact on brand loyalty only emerges through the mediating influence of CBE. Additionally, the findings suggest that the relationship between the gameful experience and both brand loyalty and usage intentions is significantly shaped

by users' SIC, shedding light on the complex interplay between personal identity and digital brand interactions.

By integrating these insights, this research contributes to the discourse on gamification's potential to enhance digital marketing strategies, particularly within the sports app sector. This investigation doesn't only extend our understanding of the psychological mechanisms underpinning the efficacy of gamified engagement tactics, it also emphasises the critical importance of aligning these strategies with users' self-perceptions and identities. This study stands as a pivotal reference point for this thesis, providing a robust empirical foundation upon which to build our examination of gamified consumer engagement in the digital age.

This article that represents the second chapter of this thesis was successfully published in the Journal of Product & Brand Management on the 27th of October 2023 (JCR-SSCI Q2 (Management), Q2 (Business), Scopus-SJR Q1) and was cited four times.

To address the second objectives of this dissertation, we introduce the second study:

Study 2: App-solute impact: how mobile technology shapes event experiences and attachment to places

This paper investigates the influence of mobile app technology on enhancing event experiences and its subsequent effects on consumer behaviours, specifically in the context of sports events. By integrating and expanding upon the Technology Acceptance Model (TAM), this study examines the antecedents of app satisfaction—including perceived ease of use, perceived usefulness, perceived information value, and app enjoyment—and their contribution to enhancing event experiences.

Drawing data from participants at the 12th Transpyr Coast to Coast race in 2022, the research offers empirical evidence that app satisfaction significantly boosts event experiences, fostering stronger place attachment and affective commitment, and encouraging positive behavioural outcomes such as the likelihood of participation again and spreading word of mouth; both traditional and electronic. Notably, the anticipated direct impact of perceived ease of use on app satisfaction was not

supported, suggesting that app satisfaction may hinge more on content and interactive features rather than mere usability.

This study enriches the existing body of literature by proposing a unique model that bridges the gap between mobile technology usage and event experiences, challenging and extending traditional applications of the TAM by incorporating dimensions of perceived information value, tailored specifically to the sports event context. The findings hold valuable implications for event organisers and app developers within the sports tourism industry, emphasising the importance of mobile app features that enhance user satisfaction and, by extension, the overall event experience.

In addressing the dissertation's third objectives, the following study is introduced:

Study 3: Gameplay to game pitfall: Unravelling problematic behaviours in Esports driven by gameful experience, psychological ownership, and seeking excellence

This third study examines the impacts of esports experiences on promoting problematic behaviours such as habit formation, addictive use, and self-regulation deficiency. Utilising a survey of 400 participants actively engaged in playing FIFA within the Spanish market, the study identifies significant links between gameful experiences, psychological ownership, seeking excellence, and their consequent effects on habit formation, addictive use, and self-regulation.

Key findings indicate that while gameful experience and seeking excellence directly influence psychological ownership and the drive towards excellence, they also lead to habit formation and self-regulation issues, which can escalate into addictive gaming behaviours. Interestingly, habit formation did not directly predict addictive use, but self-regulation deficiency was a significant predictor of addiction among esports players.

This research contributes to the field by employing a dual-system theory to understand the mechanisms behind problematic gaming behaviours, particularly highlighting the roles of gameful experience and psychological constructs like seeking excellence and psychological ownership. The study not only sheds light on the complex dynamics

driving esports players' behaviours but also provides valuable insights for researchers, practitioners, and policymakers aimed at mitigating addictive behaviours in gaming.

In summary, Table 1.2 presents all three empirical studies of this PhD thesis:

Table 1.2. Summary of the dissertation's three empirical studies

Chapter	**2**	**3**	**4**
Title of the article	Gamify, engage, build loyalty: exploring the benefits of gameful experience for branded sports apps	App-solute impact: how mobile technology shapes event experiences and attachment to places	Gameplay to game pitfall: Unravelling problematic behaviours in Esports driven by gameful experience, psychological ownership, and seeking excellence
Main Research objective	Examine the impact of gameful experiences on behavioural outcomes	Explore the impact of app technology on event experiences and on participants' behaviours	Examine the influence of the esports experience on driving problematic behaviours
Applied methodology	Quantitative	Quantitative	Quantitative
Data collection	Data collected during marathons and races	Data collected during Transpyr 2022	Data collected from Netquest (Panel)
Type of technology	Gamified branded apps	Information apps	Gaming platforms
Type of experience	Gameful experience	Event experience	Esports experience through gameful experience
Context	Gamified branded apps for running and exercising	Transpyr (Sports tourism)	FIFA
Theories	SOR	TAM	Dual-system theory

Source: Created by authors.

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Chapter 2:

2. Gamify, engage, build loyalty: Exploring the benefits of gameful experience for branded sports apps

Chapter 2 represents the first article of this thesis. Its objective is to uncover how gameful experiences influence customer-brand engagement, leading to subsequent outcomes such as brand loyalty and the intention to use the gamified branded apps in the future.

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Habachi, S., Matute, J. and Palau-Saumell, R. (2024), "Gamify, engage, build loyalty: exploring the benefits of gameful experience for branded sports apps", Journal of Product & Brand Management, Vol. 33 No. 1, pp. 57-75. https://doi.org/10.1108/JPBM-07-2022-4070.

2.1. Abstract

Purpose: This study aims to examine the impact of the gameful experience on behavioural outcomes. Drawing from stimulus–organism–response theory, it proposes and tests a new model that investigates the relationship between the gameful experience, brand loyalty, and intention to use gamified branded applications in the sports context. Additionally, it explores the mediating role of customer–brand engagement (CBE) and the moderating role of self-image congruity (SIC).

Methodology: A sample of 436 active users of sport-related branded gamified applications was used to test the model. Data was collected from online sports forums, brands' Facebook communities, and during sporting events.

Findings: Results indicate that the gameful experience positively and directly impacts behavioural intentions but does not directly influence brand loyalty. This relationship becomes partially significant when mediated by CBE. Additionally, results show that users with high levels of SIC are more likely to continue using the gamified application, while users with low levels are more likely to engage with the brand.

Originality: This study expands the gamification literature in the sports sector by revealing the importance of the gameful experience in driving loyalty, behavioural intentions, and CBE. It proposes a new model that sheds light on the emotional aspect of the interaction between a user and a gamified system and the importance of exploring the effects of moderators, such as SIC, in these relationships.

Keywords: gameful experience, brand engagement, self-image congruity, brand loyalty, intention to use, mobile apps, simulation & gaming, PLS modelling.

2.2. Introduction

Amidst the evolution of the global acceptance of mobile applications, the sports and fitness industry are one of the fastest-growing areas in the app ecosystem (Grand View Research, 2021). Fitness apps are customarily designed to detect, track, and analyse users' physical activity, providing them with an overview of their daily routes and customised training to help them keep physically fit (Edwards *et al.*, 2016). Presently, the popularisation of these apps is increasing because of the growing awareness about the importance of maintaining a healthy lifestyle (Siqi *et al.*, 2022). In 2021, the sports app market increased by 28% worldwide, reaching 385 million users (Curry, 2022); it is expected to achieve a market volume of USD 8.03 billion by 2030 (Grand View Research, 2023).

Given the popularity of these apps, many brands, intending to stay competitive and ahead in the market, have started developing and launching their own (e.g., Nike's Nike Run Club). Similarly, other brands have started to acquire popular fitness apps and convert them into branded ones, like Adidas with Runtastic or Asics with RunKeeper. However, after initial excitement and interaction with these branded applications, users often start losing interest and find them boring. Stragier *et al.* (2016) reported that 74% of these apps' new clients stop using them within 2 weeks, creating disengagement and a persistency problem. For these reasons, many companies have started integrating game-like elements into their branded apps as a solution for their customers' low engagement. This strategy, known as gamification, refers to the use of gaming techniques and game-style elements in non-gaming contexts to make the customer's experience more enjoyable and engaging (Deterding *et al.*, 2011; Hamari, 2019). According to the literature, gamification has proven efficient in motivating users to take action and complete tasks in different contexts (Behl *et al.*, 2022). The increase in gamification has brought various benefits to companies such as enhanced social, brand, and system engagement (Hsu, 2023; Xi and Hamari, 2020; Xiao *et al.*, 2021) – along with greater customer satisfaction (Torres *et al.*, 2022) and loyalty (Hwang and Choi, 2020).

However, despite the presumed benefits of gamification, recent studies reveal conflicting findings regarding its effects on consumer behaviour. For example, Liu *et al*. (2017) showed that the integration of gamification elements does not automatically yield positive results; other studies have reported that gamification leads to negative

effects such as addiction, intolerance, mood swings (Srivastava *et al*., 2022), excessive participation (Hammedi *et al.*, 2017), contradicting interactions (Leclercq *et al.*, 2020), and even disengagement from the focal task (Leclercq *et al.,* 2018). These particular effects have cast doubt on gamification's efficiency and impelled scholars to set a supplemental research agenda that goes beyond the study of game elements. This study highlights the different research gaps that need to be addressed to respond to the fundamental questions of whether and how companies can benefit from gamification strategies.

First, having ignored the perceived customer experience, previous studies have predominantly focused on measuring gamification on a mechanics level (e.g., tasks, rewards, badges, and leaderboards) (Harwood and Garry, 2015); on a dynamics level, including immersion, achievement, and social interactions (Xi and Hamari, 2020); or on a benefits level by exploring the role of epistemic, social integrative, and personal benefits (Jang *et al.*, 2018). In response to this research, recent studies have started to emphasise the need to understand the roots of gamification, its underlying processes, and potential drawbacks by primarily focusing on what the customer truly experiences (Bekk *et al.*, 2022; Eppmann *et al.*, 2018; Huotari and Hamari, 2017). These studies stress the importance of understanding the transition from the experience delivered by a gamified system, known as gameful experience (Huotari and Hamari, 2017), to the formation of an engaging relationship with the brand.

Second, little is known about how such perceived gamified experience shapes users' attitudes and behaviours in the context of branded applications. Indeed, few studies have considered users' perceived experiences as a part of their research, and anecdotal evidence suggests that gamified experiences may be an opportunity for brands to engage their customers with the company and obtain favourable brand-related outcomes, such as loyalty, positive attitudes about the brand, eWOM, and intentions to use the application (Al-Zyoud, 2021; Hamari and Koivisto, 2015b; Mishra and Malhotra, 2021). In addition, to the best of our knowledge, there are no studies and few comprehensive models that evaluate the simultaneous effect of the gameful experience on different potential customer outcomes, such as brand engagement, loyalty to the branded app, or intention to use the gamified app in the future. The inclusion of customer–brand engagement (CBE) and loyalty-related outcomes is pivotal since, on the one hand, brands pay more attention to the design of their

branded apps as a strategy to gain more customers, while, on the other hand, these apps cannot achieve their full potential unless consumers continue to use them (Fang, 2019).

Third, despite the recent increase in the literature on gamification, research aiming to understand the effect of boundary conditions in the context of gamification and branded apps is still limited. For example, the role of personal factors in the connection between the gameful experience and marketing outcomes, such as users' self-image congruity (SIC) with a specific domain like sports, has been largely ignored. The self-congruity theory postulates that self-expressive motivations prompt consumers to have more preferences for a product if the fit between an object or activity's image and their selves is high (Kwak and Kang, 2009). SIC is believed to be a critical factor in generating favourable attitudes and purchase intentions (Kang *et al.*, 2011; Sirgy *et al.*, 2008), engaging consumers in brand communities (Islam *et al.*, 2018), and causing emotional experiences while shopping (Han *et al.*, 2019). Besides, in the context of online social networks and technology use, SIC is considered a potential regulator between users' experience and attitudinal and behavioural responses (Kourouthanassis *et al.* 2015). Nonetheless, little attention has been paid to how SIC with a focal activity (e.g., sports) could affect the influence of gamification on users' reactions and, therefore, determine the failure or success of a gamified app across different types of users.

To address these gaps, drawing on the stimulus–organism–response (SOR) model, the current research seeks to explore how a gamified experience (stimulus) influences brand loyalty and a user's intention to continue using a branded gamified app (response) by enhancing engagement with the brand (organism). Previous research has consistently shown that consumers' gameful experiences with a technological device or app impacts their desire to keep using it and influences their preferences towards the company developing the related technology (Al-Zyoud, 2021; Xi and Hamari, 2020). The literature also suggests that gamification strategies lead to increased customer engagement and, more specifically, engagement with a brand (Berger *et al.*, 2018). Therefore, this study proposes that a gamified experience can directly determine these outcomes and, indirectly, affect outcomes through CBE. In addition, the model also explores how users SIC with sports moderates the influence of the gameful experience on CBE, brand loyalty, and intention to use the branded

sports apps. Previous studies suggest that the match-up effect of consumer self-image and product/brand/activity user image can alter the influence of consumers' judgments and experiences on their preferences and intentions (Kleijnen *et al.*, 2005; Kourouthanassis *et al.*, 2015).

2.3. Literature review and research hypotheses

2.3.1. Theoretical framework

This study adopts the SOR model (Mehrabian and Russell, 1974) as the foundation for building the conceptual relationships between the investigated constructs. Essentially, the SOR model asserts that the environment – with all of its different attributes – acts as a stimulus (S) impacting individuals' psychological states and organisms (O) and, subsequently, their behaviours and attitudes (R). The gameful experience is the "stimulus" that occurs when a user interacts with a branded gamified application (Eppmann *et al.*, 2018; Huotari and Hamari, 2017). Gamification uses different game elements as stimuli to create experiences impacting customer states (e.g., CBE), which, in turn, leads to desired behavioural outcomes (Gatautis *et al.*, 2016; Hamari and Koivisto, 2015a). The "organism" defines the internal states that take place in the process between the occurrence of the stimuli and customers' behavioural responses. The organism is defined as customer-brand engagement and represented by three dimensions: cognitive, affective, and activation (Hollebeek *et al.*, 2014). The "response" reflects the individuals' final behavioural outcomes as a reaction to the organism (Islam *et al.*, 2020) and/or to the stimulus (Xi *et al.*, 2021).

Furthermore, this study employs SIC as a moderator to investigate the extent to which identification with sports alters the relationship between the gameful experience and behavioural outcomes. The self-congruity theory (Sirgy, 1985), grounded in the theories about the self, refers to the self-concept as "the totality of the individual's thoughts and feelings having reference to himself as an object." (Rosenberg, 1979, p.7). Thus, the self-concept is considered an overarching idea that explains how individuals perceive themselves on several levels (e.g., physical, emotional, social). Studies in the consumption context propose that individuals support their self-concept by choosing brands that are highly congruent with their perception of their selves or their self-image (Li *et al.*, 2022). In this regard, SIC reflects the state in which customers' images of their self-concept and a brand/experience's images match and

remain consistent (Li *et al.*, 2022; Sirgy *et al.*, 2000). In this study, the self-congruity theory is explored in relation to a focal activity, such as playing sports.

2.3.2. Gamification and users' experience

Gamification refers to the technical process of incorporating, into a system, features that are characteristic of games (Hamari, 2019; Huotari and Hamari, 2017). While games, by definition, are rule-based systems in which players must achieve different goals to obtain specific outcomes, gamified systems (e.g., a gamified application) are entities that include gamification elements that are not necessarily required for the system to fulfil its basic function (Deterding *et al.,* 2011). Thus, gamification is about taking the essence of games and applying it to real-world objectives and challenges rather than using it purely for entertainment (Palmer *et al.*, 2012). For example, branded sports apps typically include gamified elements in their function that try to motivate users to achieve specific goals. These features can include badges, awards for special milestones (such as completing a certain number of workouts, maintaining training frequency, or achieving a distance run), progress bars, leaderboards, social media sharing options, and so forth. While the main function of the application is not primarily focused on providing enjoyable elements, the inclusion of all of these functions optimises the user experience as the application makes it more appealing and enjoyable (Eppmann *et al.*, 2018). Hence, gamification aims to magnify the interplay between the user and the gamified system by delivering an enjoyable experience that lasts beyond the game process and onto the after-game one (Högberg *et al.*, 2019).

Gamification has proven advantageous in creating gameful experiences that lead to the stimulation of the users' interests towards one specific domain and increase their engagement with the gamified system (Huotari and Hamari, 2017). The concept of gameful experiences emerged in the recent literature and refers to the psychological effects that result from using a gamified application. According to Eppmann *et al.* (2018, p. 100) and Deterding *et al.* (2011), the gameful experience in a non-game context refers to all of the different "positive emotional and involving qualities of using a gamified application." Therefore, on the one hand, the gameful experience entails different emotional states derived from the interaction with the system, including joy, pleasure, fun, or the absence of negative emotions. On the other hand, it focuses on the different involvement elements characteristic of playing games (Mishra and

Malhotra, 2021). Thus, the gameful experience is the natural consequence of the inclusion of gamification elements into a system and reflects the feelings that users experience as a result of interacting with it.

Given the heterogeneity of these feelings, the concept of gamified experience is, in essence, multidimensional. To capture this multidimensionality, Eppmann *et al*. (2018) developed the gameful experience scale (GAMEX). The authors' conceptualisation and measurement instrument is considered to be a reliable and valid tool for comprehensively capturing the customer's positive emotional and involvement-related qualities when interacting with a gamified system. According to Eppmann *et al.*, GAMEX is composed of enjoyment, absorption, creative thinking, activation, absence of negative affect, and dominance. Enjoyment is the nature of positive emotions that a customer feels when interacting with an activity. Absorption refers to the feeling of disconnectedness from an actual environment and the level of concentration on a focal engagement object (Scholer and Higgins, 2009). The creative thinking dimension focuses on the explorative and imaginative features of the gameful experience. The fourth dimension, activation, is defined as the mental state of being alert, attentive, and activated, which leads to the individual's assessment of the significance of a stimulus (Bakker *et al.*, 2014). Next, absence of negative affect refers to the exclusion of negative emotions and expressions such as sadness, fear, disgust, and distress. Lastly, dominance is associated with the level of control that an individual experiences when interacting with an environment and how autonomous and free the individual feels within that environment (Bakker *et al.*, 2014).

Overall, the gameful experience is a complex and multidimensional psychological construct that has been underexplored in the gamification and branding literature. The ability to fully understand the consequences of gameful experiences can be useful to determine the success of the inclusion of gamification elements into branded applications. By focusing on the perceived psychological outcomes resulting from a gamified experience rather than analysing its gamification mechanics, researchers can better predict the marketing outcomes derived from the interaction between the user and the branded app.

2.3.3. Effects of the gameful experience: brand loyalty and behavioural intentions towards the branded app

The inclusion of gamification elements can exert a positive effect on different consumer-related outcomes (Hamari, 2017; Feng *et al.*, 2020; Xi and Hamari, 2020). For this reason, many companies have started to include gamified features in their mobile apps to improve their users' experience, gain new customers, and reinforce existing customers' positive attitudes towards the brand (Eisingerich *et al.*, 2019; Xi and Hamari, 2020). Nevertheless, as suggested by Fang (2019), an app cannot exert its total influence unless customers continue to use the branded app in the future. Therefore, companies must understand not only how loyalty towards a particular brand can be elicited by gamifying a branded app but ascertain whether the gameful experience determines customers' continuance intention towards the app. Thus, this study focuses particularly on investigating the direct effects of the gameful experience on customers' brand loyalty and their intention to continue using a branded app. By extending the gamification-loyalty link in our model, the study also hypothesises that CBE mediates the influence of gameful experience on brand loyalty and intention to use the app in the future (Abou-Shouk and Soliman, 2021, Bitrián *et al.*, 2021).

2.3.3.1. The effect of gameful experience on brand loyalty towards the brand

Brand loyalty refers to a customer's determination to continually repurchase or re-patronise a favoured good/service in the future despite external factors (e.g., situational influences or marketing efforts) that may lead to switching behaviours (Oliver, 1999). Brand loyalty, therefore, is the level of commitment and attachment customers have for a specific brand, as well as their intention to buy the focal brand as a primary choice (Yoo and Donthu, 2001). In the context of branded applications, brand loyalty is considered a specific behavioural outcome resulting from the interaction between the user and the app that signals a longstanding relationship between the customer and the brand (Fang, 2019). In this study, brand loyalty specifically refers to a user's behavioural intentions (e.g., rebuy or re-patronise) towards the specific brand that owns the fitness/sports application.

As previously noted, the gameful experience embodies the feelings users have when doing something engaging as a result of interaction with a gamified system (Domínguez *et al.*, 2013). Hence, in the context of branded apps, the gameful experience refers to the positive emotional and involvement-related characteristics

resulting from the use of a gamified branded app. According to the interpersonal relationship theory (Fournier, 1998), in associations between consumers and companies, the brand is an active contributing actor in the relationship dyad and plays an important role in reinforcing such relationships. A positive experience resulting from the interaction with a brand may lead consumers to repeat these experiences and reciprocate with positive behaviours benefitting the brand (Ramaseshan and Stein, 2014). Therefore, in a gamified context, the gamified experience will not only affect customers' relationship judgments but will also increase brand loyalty because it leads to an experience of pleasant outcomes that reinforces the relationship between the user and the brand (Hwang and Choi, 2020). Generally, the literature on gamification acknowledges that the experience users have while interacting with a branded gamified application can have a positive effect on user preference towards a brand (Al-Zyoud, 2021; Li and Fang, 2020). Specifically, when a user undergoes a positive experience with a branded gamified app, this situation creates an emotional bond leading consumers to maintain their desire to sustain the relationship with the brand. This desire leads consumers to repurchase the brand's products/services repetitively or advocate the brand (Al-Zyoud, 2021; Jang *et al.*, 2018). For example, Kim and Ah Yu (2016) found that the inclusion of interactive features in branded apps leads to the creation of one-of-a-kind customer experiences that reinforce loyalty towards the company (Kim and Ah Yu, 2016; Kim *et al.*, 2013). Similarly, in the context of e-commerce, Al-Zyoud (2021) showed that consumers tend to be more loyal to online stores when experiencing the emotional effects of gamification while interacting with retailer websites. Overall, consumers tend to engage in approach behaviours with a desire to maintain their relationship with the focal brand when they perceive the experiential benefits that derive from their interactions with a gamified application. Therefore, based on past evidence, it is proposed that:

H1: Users' gameful experience with a branded app directly and positively influences their loyalty towards the brand.

2.3.3.2. The effect of gameful experience on users' behavioural intentions towards the branded app

Behavioural intentions indicate how individuals exert themselves in performing a certain behaviour (Azjen, 1991). Therefore, these intentions reflect individuals' likelihood to engage in a specific act and are acknowledged as precursors to the real

one (Oliver, 1997). Favourable behavioural intentions lead to an enhanced relationship between the individual and a product/service, which results in a lower tendency to switch to the competition and an increased willingness to making additional efforts to maintain this interaction (Kim, 2021). In terms of technology usage, intention is the individual's desire to perform, or to not perform, some specified future behaviour with such technology (Venkatesh and Davis, 2000); as it pertains to branded apps, intention refers to the future intent to keep using services through a specific branded app (Fang, 2019). In this study, behavioural intentions indicate the future intention of customers to use the branded gamified mobile application to perform their sports activities in the future.

It was previously suggested that the inclusion of gamification elements increases the probability that a user will want to use a particular technology in the future (Perez-Aranda *et al.*, 2023; Tu *et al.*, 2019). In this sense, the use of gamification enhances the services offered by the app. As a result, an emotional experience, also known as the gameful experience, occurs between the user and the app (Huotari and Hamari, 2017), leading to a higher intention of use in the future. According to the service-dominant logic theory (SDL) (Vargo and Lusch, 2004), customers should be regarded as active participants that supply the values that will best fit their needs, thus co-creating the interaction with the service. This process will lead to the creation of distinct and positive experiences that will affect customers' behavioural intentions (Wang, 2014). Therefore, SDL focuses on the significance of understanding and providing unique customer experiences through the judging of customer roles in shaping future behavioural intentions. In this way, the use of gamification offers a customisable journey to every user, based on their backgrounds, needs, habits, and acknowledgement of certain facts about them, which makes users' impression of their experience grow by leaps and bounds (Chen and Pu, 2014; Hamari and Koivisto, 2015b). As a result, consumers who use fitness applications incorporating game elements may have higher intentions to continue using these apps (Tu *et al.*, 2019). Therefore, it is expected that a better-gamified experience with a branded app will enhance behavioural intentions to continue using such an app in the future, so it is hypothesised that:

H2: Users' gameful experience with a branded app directly and positively influences their behavioural intentions to use it in the future.

2.3.3.3. The mediating role of customer brand engagement

This study suggests that the influence of a gamified experience can also influence brand loyalty and behavioural intentions by eliciting the level of engagement that the user has with the brand. CBE is defined as the level of a customer's physical, cognitive, and emotional state that leads to interaction, vigour, dedication, and absorption, which, in turn, affect the individual's purchase intention, brand loyalty, and preferences (Ahn and Back, 2018). With this in mind, Brodie *et al*. (2011) examined how CBE goes beyond the transactional relationship between customer and brand and signifies more of a motivational and emotional state. Consistent with this view, Hollebeek *et al*. (2014, p.154) defined CBE as "a consumer's positively valanced brand-related cognitive, emotional and behavioural activity during or related to focal consumer/brand interaction." Therefore, the present study uses this understanding of CBE and considers it a higher-order construct composed of cognitive processing, affection, and activation. First, cognitive processing refers to the amount of brand-related thought a person puts into the interaction with the brand (Hollebeek *et al.*, 2014). That is, cognitive processing reflects the level of interest that the person has for the brand engaged with. (Vivek *et al.*, 2014). Second, affection indicates how positive the person feels about the interaction with the brand (Hollebeek *et al.*, 2014). Therefore, this concept is linked to customer feelings towards the brand. Third, activation refers to customer effort spent interacting with the brand in terms of time and energy (Hollebeek *et al.*, 2014).

CBE can be one of the main mechanisms with which the gameful experience influences brand loyalty and intention to use the branded app. Previous studies have emphasised the significance of customer experiences in fostering brand engagement (Brodie *et al.*, 2011; Huotari and Hamari, 2017). Thus, providing customers with gameful experiences in their interactions with technology through gamified branded apps can help trigger the journey that leads to brand engagement. In this sense, the empirical research suggests a positive relationship between the inclusion of gamification elements and the level of engagement that a customer feels towards the brand (Jang *et al.*, 2018; Leclercq *et al.*, 2018; Xi and Hamari, 2019). This relationship occurs because the use of gamification mechanics facilitates the creation of positive and enjoyable customer experiences that help boost and maintain the momentum created between an app and its user. For instance, Abou-Shouk and Soliman (2021)

found a positive relationship between the adoption of gamified applications and customer engagement in the tourism sector (Abou-Shouk and Soliman, 2021). In the sports context, Jang *et al*. (2018) established that gamifying the customer experience is beneficial as it leads to higher levels of engagement. Similarly, customer benefits resulting from gamified packages were found to be related to consumer engagement with the brand (Syrjälä *et al.*, 2020).

It has also been suggested that when customers are more engaged, they may be more willing to reuse the gamified application in the future and exhibit a higher level of brand loyalty. On the one hand, past empirical studies suggest that CBE is positively related to brand loyalty (Hsu and Chen, 2018; Hwang and Choi, 2020; Jang *et al.*, 2018). When customers engage with a gamified app, interaction with its game elements leads to a positive user experience that significantly increases their brand loyalty. Hassan *et al*. (2019) concluded that customers' social interaction with a service positively impacts their loyalty to it. Similarly, Abou-Shouk and Soliman (2021) showed that the higher the customer engagement with a gamified application, the stronger their brand loyalty and the more they will want to learn about the brand. On the other hand, CBE can also increase users' intentions to continue using gamified technology. In this sense, engaged customers tend to use an application more than non-engaged users, investing their time, money, and energy because they think more about the brand and show more of the positive emotions that lead to this behavioural intention (Qing and Haiying, 2021). A fulfilling user experience when interacting with a branded application results in a higher level of engagement, leading to an intention to use it in the future. In line with this notion, researchers have described the positive influence of engagement on users' intention to use mobile applications (Tarute *et al.*, 2017). For example, the positive effect of CBE on the continuance intention of using a branded app was found among Chinese users of this technology (Qing and Haiying, 2021) and users of the Fitbit app (Bitrián *et al.*, 2021).

In summary, based on the above reasoning, we propose that CBE mediates the relationship between the gameful experience and brand loyalty and between the influence of the gameful experience on behavioural intentions to use gamified branded apps. Users of a gamified system are more likely to engage with it and do activities that lead to increased loyalty; they also generally use the service more actively and persistently (Hamari, 2017). Therefore, the following hypotheses are proposed:

H3: CBE mediates the positive influence of the users' gameful experience with a branded app on their loyalty towards the brand.

H4: CBE mediates the positive influence of the users' gameful experience with a branded app on their behavioural intentions to use it in the future.

2.3.4. The moderating role of self-image congruity

SIC is a process through which individuals reflect on source images and match these to their self-concepts (Sirgy, 1985). Following this conceptualisation, individuals attempt to display behaviours according to the image they have of themselves (Kourouthanassis *et al.*, 2015). Previous studies have identified SIC as composed of the actual, ideal, social, and social ideal self (Sirgy, 1985). Actual SIC, used in this study in line with the previous research (Kang *et al.*, 2009), refers to how individuals see themselves (Sirgy, 1985). In this study, SIC specifically refers to the cognitive match between the individual's self-image and the perceived image of sports as a leisure activity. For example, a person who sees him/herself as a runner (actual self-concept) is more likely to feel motivated to purchase running outfits and use a running application to be perceived as one. Therefore, SIC may play an influential role in behavioural intentions such as brand loyalty and intention to use a brand (Sirgy, 1985) because the symbolic meaning associated with consumption is often expressed through the use of branded products.

SIC was found to be positively associated with attitudinal and behavioural outcomes (Kleijnen *et al.*, 2005; Kourouthanassis *et al.*, 2015) and to contribute to the development of positive emotional experiences (Han *et al.*, 2019; Lee *et al.*, 2017). In addition, besides this direct influence, SIC can affect the intensity of relationships between a stimulus and an organism or response (Sirgy *et al.*, 2000). For instance, Kleijnen *et al.* (2005) found that SIC moderated the relationship between consumption and adoption behaviours in wireless service use that goes beyond the direct impact of SIC on consumers' adoption decisions. In line with this finding, Kourouthanassis *et al.* (2015) determined that individuals perceiving their social network services as aligned with their self-image are more likely to continue using these sites, regardless of whether or not they are satisfied with the service. Previous studies have also explored the moderating effect of SIC on customer experiences, brand loyalty, and purchase intentions (Gabisch, 2011). Therefore, the inclusion of an experiential element like the gameful experience in a system can lead to benefits for users who demonstrate higher

levels of SIC with the experience's contextual domain (e.g., sports). We hypothesise that these positive outcomes may happen because, for users with high SIC with sports, the experience with the app helps reinforce views about themselves, which will then be translated into higher levels of engagement with the brand and more favourable intentions towards the brand and the branded app. As it is both a brand and a product, a branded app can be used as a symbol defining the individual self since it helps the user reinforce his or her habits and lifestyle around sports. Drawing on the above, it is expected that the effect of the gameful experience on CBE, brand loyalty, and intention to use the gamified app in the future will be stronger for individuals with high SIC with sports than for those with low SIC. In other words, SIC reinforces the positive influence of the gameful experience on CBE, brand loyalty, and continuance intentions. Therefore, the following hypotheses are proposed:

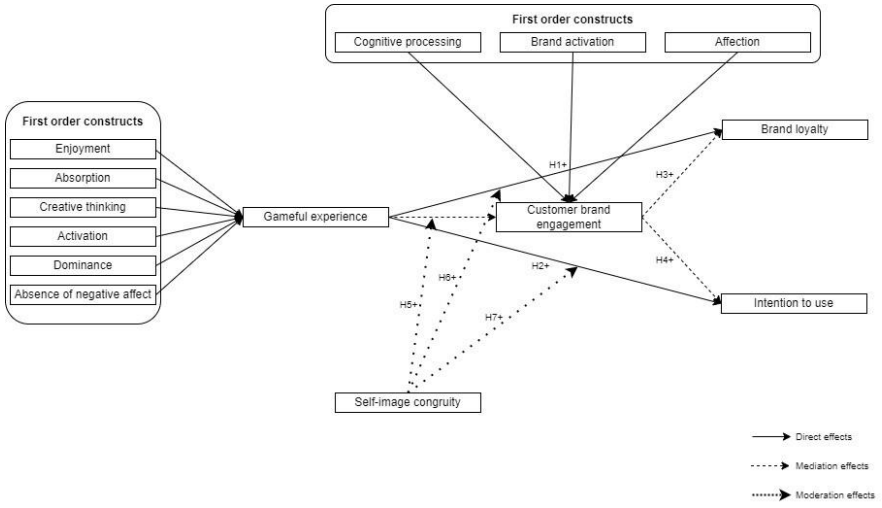
H5: SIC moderates the influence of the gameful experience on CBE, such that the higher the level of SIC, the greater the positive effect of the gameful experience on CBE.

H6: SIC moderates the influence of the gameful experience on brand loyalty, such that the higher the level of SIC, the greater the positive effect of the gameful experience on brand loyalty.

H7: SIC moderates the influence of the gameful experience on behavioural intentions to use the app, such that the higher the level of SIC, the greater the positive effect of the gameful experience on continuance intentions.

The hypotheses proposed above are presented in Figure 2.1.

Figure 2.1. Research model



2.4. Methodology

2.4.1. Research context

As the research model was tested in the context of the sports and fitness industry, branded gamified sports applications were selected as the target of this study. To select these apps, a filtering process was implemented. First, the apps needed to be linked to the sports and fitness industry, so, to find them, the health and fitness sections of the Google Play Store and Apple Store were searched, resulting in over 50,000 applications. Only applications related to running or exercising were considered, and every other type of mobile health apps was excluded. Second, the applications had to be branded. This prerequisite narrowed the list down to apps only developed or owned by brands. The third selection criterion was the inclusion of gamification elements in the apps to ensure that the gameful experience occurred when the user interacted with the system. For this, the presence of game elements, such as avatars, badges, or progress bars, was investigated by downloading the apps and testing them. The last initiated filter was the number of downloads, resulting in a final selection of branded gamified applications. Following this process, the top 10 branded gamified applications were included as choices in the questionnaire, along with the addition of the option “others” to not limit answers. Of these apps, three were free of charge; users had to create an account, start their workout, and monitor their progress. Only one of the proposed apps was a premium version; in this app, users had 14 free-trial days, and, after this, they needed to start paying a monthly subscription fee. The remaining apps were freemium versions in which basic services were provided for free, but most advanced features required payment.

2.4.2. Procedure

The data was collected using an online survey targeting active users of gamified running and fitness branded applications, regardless of users’ level of expertise. Data collection lasted from May to September 2021; data were gathered from online running forums (e.g., Let’s Run, Runners Forum), Facebook groups for runners or for those who exercise in general (e.g., Copines de Running, Run in Montreal, Walking 4 Fitness, Women’s Running Community), and specific communities found in the selected applications (e.g., Nike Run Club). Selection of these online communities was made by exploring the number of users beforehand, observing the level of daily engagement and activity, and confirming that comments related to sports or running

apps frequently came up in online conversations. The study aimed to target active online forums and communities made up of involved users likely to exhibit a good understanding of the usage of branded sports apps. To gather information, group owners or moderators were contacted to explain the research goals and asked for permission to post a link to the survey. In open groups, not requiring approval, the link was posted directly and requested the members' participation in the study. Additional survey responses were collected from participants in organised marathons in Barcelona between August and September 2021. The choice of Barcelona was deliberate because it is a prime location for organised races in Spain.

The questionnaire was developed in English, translated to Spanish and French by native English language academics, and backtranslated to English by an independent native English language translator. The back-translation process (Craig and Douglas, 2000) ensured that all items were equivalent across the three languages. Permutation analysis following the Measurement Invariance Assessment in Composites (MICOM) routine (Henseler *et al*., 2016) revealed no differences in the formation of the composites across groups. The questionnaire was initially piloted with a group of 30 international and national members of the Midnight Runners' community in Barcelona, which is made up of runners and athletes of varying socio-demographic profiles. After collecting the feedback, minor changes were made to the wording of several questions. A copy of the questionnaire is provided in Appendix A.

To ensure that participants were using branded gamified applications and not confusing them with non-branded gamified versions such as Strava or Freeletics, the following control question was included in the survey: *Which sports app do you use more frequently? E.g., Nike Run Club, Fitbit, Adidas Run by Runtastic, etc.* After data screening, incomplete questionnaires, questionnaires from participants who responded about a non-branded application, and those with answers exhibiting abnormal response patterns (e.g., inertia) were removed. As a result, a total of 436 answers were considered valid. Kurtosis and skewness values ranged from –1.444 to 0.905 and −1.370 to 0.995, respectively, and are both between +3 and −3. Statistical power analysis using G*Power 3.1 software was employed to check the minimum sample size required (Faul *et al.*, 2009). For an exigent small-effect size of $f^2 = 0.050$, a statistical power level of 0.950, 6 predictors, and an alpha level of 0.05, the minimum sample size was 218. Thus, the obtained sample size was acceptable to test the

statistical significance of the proposed model. Of the respondents, 35.6% were between 36 and 45 years old, 56.4% were male, and 61.3% were employed. The majority of respondents used Nike Run Club (35.6%) as the app for their regular physical activity. A more detailed overview of the characteristics of respondents appears in Table 2.1.

Table 2.1. Sample description

Gender		**Experience with the app**	
Male	56.4%	Less than 3 months	8.9%
Female	38.6%	3-6 months	6.9%
Non-binary/others	5%	6-12 months	21.9%
		>12 months	62.3%
Level of education		**Branded application**	
		Nike Run Club	35.6%
None		Adidas Running	9.9%
Primary school	2%	RunKeeper by Asics	5%
Secondary school	1%	Fitbit	6%
Professional	8.9%	Under Armour Map my run	11%
training	13.8%	Nike training club	6%
Bachelor's degree	35.7%	Adidas Training by Runtastic	4%
Master or PhD.	38.6%	Asics studio	2%
degree		Garmin Connect	11.4%
		Others	9.1%
Age		**Occupation**	
		Employed	61.3%
18-24	5%	Self-employed	12.9%
25-35	13.8%	Student	20.8%
36-45	35.6%	Unemployed	2%
46-55	34.6%	Retired	3%
56-66	10%		
		Frequency of usage	
		Once per week	9.9%
		Twice per week	25.7%
		3 times per week	40.6%
		4 times per week	8.8%
		5 times per week	7%
		More than 5 times per week	8%

Source: Created by authors.

2.4.3. Questionnaire design and measurement

The study used a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree) based on instruments validated in previous studies. The questionnaire, inspired from Xi and Hamari's (2020) design, incorporated different blocks with the different latent

variables included in the research model. The first block included questions about participants' socio-demographic status. The second covered questions related to the gamified branded app and about its brand. The third focused on users' history with the app (e.g., length of membership, frequency of app usage). The next 2 blocks contained questions about users' the gameful experience with the app, CBE, brand loyalty, behavioural intentions, and brand-image congruity items. The items were adapted according to the specific branded app and brand that respondents chose in the second block of the survey thanks to the functionality of the online survey design.

Regarding the constructs' specification, users' the gameful experience was conceptualised as a second-order mode B construct composed of 6 first-order reflective latent variables: enjoyment (ENJ), creative thinking (CT), dominance (DOM), absence of negative affect (ANA), app activation (APPACT), and absorption (AB). To measure this concept, the GAMEX scale proposed by Eppmann *et al.* (2018) was employed by adapting it to the specific context of sports mobile apps. Specifically, ENJ was measured with 3 from the 6 original items reflecting the emotional positive valence derived from user's interaction with the app (e.g., "Using [app] is fun"). Activation was measured by 4 items and captured users' level of arousal and excitement while using the app (e.g., "While using [app] to practice sports, I feel activated"). ANA included 3 reversed items measuring users' potential negative affective states derived from GAMEX (e.g., "While using [app] to practice sports, I feel upset"). The AB dimension covered 5 of the 6 original items that included aspects such as loss of self-consciousness, attentive concentration, or distorted sense of time (e.g., "While using [app], I lose track of time"). The DOM dimension, composed of 4 items, captured users' feelings about whether they felt influential and autonomous while using the app (e.g., "While using [app] to practice sports, I feel influential"). Finally, the CT element was measured with 4 items covering aspects such as users' feelings of exploration or creativity while interacting with the app (e.g., "While using [app] to practice sports, I feel creative"). Two-tailed confirmatory tetrad analysis (Gudergan *et al.*, 2008) with 8,000 subsamples revealed that, from the potential 9 tetrads, in 4 of them, the Bonferroni-adjusted confidence interval did not result in a value of zero. This suggests that the reflective measurement model should not be substantiated for GAMEX.

Following Hollebeek *et al*. (2014), CBE was measured as a second-order mode B construct formed by the cognitive processing, activation, and affection dimensions.

Specifically, cognitive processing included 3 items covering users' level of cognitive load and interest stimulation when using the brand (e.g., "Using [brand's] products gets me to think about [brand]"). The activation element, measured with 3 items, captured individuals' level of usage of the brand (e.g., "I spend a lot of time using [brand's] products compared to other brands"). The affection factor, measured with 4 items, showed users' affective evaluations of brand usage (e.g., "I feel good when I use [brand's] products"). These first-order dimensions were measured in mode A. Brand loyalty was measured using 4 items adapted from Chaudhuri and Holbrook (2001) and Hsieh *et al*. (2021). The scale included users' self-evaluations about their purchase intentions, affection towards the brand, and willingness to recommend it (e.g., "I will not buy other brands if [brand] is available at the market"). The behavioural intention to use the application was measured with 4 items using Chiu and Cho's (2020) scale. This construct reflected individuals' future intentions to keep using and interacting with the branded app (e.g., "I will use [app] on a regular basis in the future"). Finally, to measure the SIC moderator, 3 items were adopted from Kourouthanassis *et al*. (2015) and Kang *et al.* (2009). These items captured individuals' perceptions on how the focal activity – practicing sports – helped them to build and portray their self-images (e.g., "Practicing sports helps reflect who I am"). As control variables, the model included age, education, and frequency of use of the gamified sports app as potential predictors of the endogenous variables.

2.4.4. Common method bias assessment

Because the data originated from a one-time survey, common method bias was assessed to prevent this issue (Podsakoff *et al.*, 2003). First, all participants were informed that participation in the study was voluntary and that the anonymity and confidentiality of the data were assured. Second, to avoid participant inference with the goal and causality of the model and its relationships, the order of the dependent and independent variables was presented randomly. Third, the participants were able to add their email addresses at the end of the survey to participate in a raffle draw. The prize was a pair of shoes from the winner's favourite brand; only participants with valid answers could participate in the raffle. Fourth, a full collinearity test based on variance inflation factors (VIF) was used to discard any possible bias. The analysis showed that all VIF values ranged from 1.074 to 2.104, and all values were lower than 3.3, which indicates the absence of common method bias in this study (Kock, 2015).

Finally, a complementary Harman's single-factor test was performed. The results of this procedure confirmed that common method bias was not present in the study since the fit of the model, in which all individual indicators loaded on assigned latent variables, was larger than that of the competitive models that incorporated all items into a unique construct.

2.5. Results

This study applied the partial least squares structural equation modelling (PLS-SEM) technique with SmartPLS 3.0 software to test the proposed hypotheses. PLS-SEM was chosen for this study for the following reasons: First, the nature of the latent variables is compatible with the composite constructs, especially multidimensional ones that use linear combinations of manifest variables as proxies of the conceptual variables. Second, our research model incorporated a combination of both first- and second-order constructs and direct, indirect, and moderating relationships. Therefore, PLS-SEM is the proper tool to manage these numerous structural model relationships (Manley *et al.*, 2021). Third, PLS-SEM is more appropriate for conceptual models that include simultaneous composites with formative (mode B) and reflective (mode A) indicators, which is the case in this study (Hair *et al.*, 2011).

2.5.1. Measurement model assessment

As previously noted, users' gameful experience and CBE were conceived as second-order constructs. A two-stage approach was applied to estimate these multidimensional constructs (Wetzels *et al.*, 2009). In the preliminary first-order estimation stage, all first-order latent variables were measured as reflective mode A, and one item was removed from the APPACT dimension of the GAMEX scale because of its low individual reliability. In the second stage, the second-order final measurement model was estimated after obtaining the latent variable scores for the first-order constructs. Tables 2.2 and 2.3 show the results of the measurement model assessment. All the constructs were internally consistent, as their individual and composite reliability estimates exceeded the recommended threshold of 0.70 and the acceptable threshold of 0.60 (Hair *et al.*, 2022) (Table 2.2). The constructs' average variance extracted (AVE) values were above the critical threshold of 0.50. Therefore, the constructs presented convergent validity (Hair *et al*., 2019) (Table 2.2). Moreover, the Heterotrait-Monotrait (HTMT) ratios were analysed to verify the constructs' discriminant validity. Results confirmed the existence of discriminant validity among

all the constructs since the HTMT ratios were below the threshold of 0.85 (Henseler *et al.*, 2015) (Table 2.3).

Regarding the mode B multidimensional constructs, the VIFs ranged from 1.360 to 3.817 (Table 2.2). This suggests that the formative indicators for the second-order constructs do not present critical levels of multicollinearity (Hair *et al.*, 2011). In addition, external validity was analysed by assessing the indicators' weights. Indicators have external validity when they have statistically significant weight. If an indicator's weight is not significant, but the corresponding loading is high (i.e., above 0.50), the indicator has external validity and should be retained (Hair *et al.*, 2017). In this study, the DOM, CT, and ANA dimensions of the gameful experience construct presented non-significant weights. Following Hair *et al.* (2017) recommendations, their outer loadings were assessed and were found to exceed the recommended threshold of 0.50, except for ANA, which was low, with a value of 0.390 (Table 2.2). The significance of ANA's outer loading was then assessed. A complementary bootstrapping analysis with 8,000 subsamples was conducted to confirm its significance ($p < 0.001$) (Hair *et al.*, 2017) (Table 2.2). Therefore, these dimensions were retained to preserve content validity and because they were not identified as problematic indicators causing collinearity issues.

Table 2.2. Measurement model

Construct/*Dimension***/**Indicator	**Outer loadings**	**Outer weights**	**VIF**	**CR**	**AVE**
Gameful Experience (MC)					
Enjoyment (ENJ)	***0.959****	***0.568****	*3.512*	*0.955*	*0.876*
ENJ1	0.947	0.366			
ENJ2	0.924	0.343		-	
ENJ3	0.937	0.359			
App Activation (APPACT)	***0.899****	***0.241*** **	*3.817*	*0.846*	*0.620*
APPACT1	0.873	0.358			
APPACT3	0.905	0.369		-	
APPACT4	0.930	0.361			
Creative Thinking (CT)	***0.826****	***0.035***	*3.222*	*0.941*	*0.799*
CT1	0.876	0.250			
CT2	0.916	0.290		-	
CT3	0.875	0.276			
CT4	0.906	0.302			
Absence of Negative Affect (ANA)	***0.340****	***0.059***	*1.360*	*0.959*	*0.885*
ANA1	0.952	0.366			
ANA2	0.934	0.383		-	
ANA3	0.937	0.313			
Absorption (AB)	***0.754****	***0.194****	*2.250*	*0.906*	*0.662*
AB1	0.672	0.248			
AB2	0.862	0.232			
AB3	0.862	0.239		-	
AB4	0.867	0.263			
AB5	0.787	0.253			
Dominance (DOM)	***0.580****	***0.075***	*1.966*	*0.893*	*0.678*
DOM1	0.726	0.468			
DOM2	0.831	0.239		-	
DOM3	0.883	0.290			
DOM4	0.845	0.243			

Source: Created by authors.

Table 2.2. Measurement model. Continued

Construct/*Dimension***/**Indicator	**Outer loadings**	**Outer weights**	**VIF**	**CR**	**AVE**
Customer Brand Engagement (MC)					
Cognitive Processing (CP)	***0.844****	***0.292****	*2.081*	*0.937*	*0.832*
CP1	0.921	0.354			
CP2	0.904	0.334		-	
CP3	0.911	0.408			
Brand Activation (ACT)	***0.878****	***0.308****	*2.459*	*0.963*	*0.896*
ACT1	0.937	0.341			
ACT2	0.951	0.348		-	
ACT3	0.951	0.367			
Affection (AFF)	***0.934****	***0.517****	*2.384*	*0.963*	*0.868*
AFF1	0.941	0.278			
AFF2	0.916	0.243		-	
AFF3	0.945	0.274			
AFF4	0.924	0.278			
Brand Loyalty (LOY)			**-**	**0.935**	**0.782**
LOY1	0.914	0.296			
LOY2	0.894	0.303		-	
LOY3	0.830	0.240			
LOY4	0.896	0.290			
Intention to use (INT)			**-**	**0.966**	**0.876**
INT1	0.925	0.258			
INT2	0.947	0.307		-	
INT3	0.937	0.248			
INT4	0.935	0.255			
Self-Image Congruity (SIC)			**-**	**0.967**	**0.907**
SIC1	0.939	0.341			
SIC2	0.957	0.353		-	
SIC3	0.961	0.356			

Note: MC = Multidimensional Construct; VIF = Variance Inflation Factor; CR = Composite Reliability; AVE = Average Variance Extracted.

Source: Created by authors.

Table 2.3. Discriminant validity analysis: Heterotrait-Monotrait Ratios

	1	2	3	4	5	6	7	8	9	10	11
1. AB											
2. APPACT	0.731										
3. ACT	0.476	0.532									
4. AFF	0.478	0.616	0.763								
5. ANA	0.303	0.431	0.271	0.297							
6. CP	0.594	0.548	0.729	0.713	0.234						
7. CT	0.729	0.778	0.470	0.547	0.363	0.491					
8. DOM	0.571	0.476	0.294	0.331	0.406	0.364	0.493				
9. ENJ	0.676	0.850	0.517	0.600	0.295	0.503	0.801	0.475			
10. INT	0.397	0.679	0.416	0.466	0.088	0.406	0.471	0.281	0.641		
11. LOY	0.524	0.614	0.806	0.777	0.235	0.753	0.529	0.356	0.574	0.535	
12. SIC	0.267	0.381	0.288	0.283	0.109	0.309	0.266	0.205	0.454	0.612	0.594

Note: See acronyms in table 2.2.
Source: Created by authors.

2.5.2. Structural model assessment

After analysing the measurement model, the statistical significance of the standardised paths was examined with a bootstrapping procedure of 8,000 subsamples. The model explained 49.8% of the variation of the users' CBE, 46.5% of the variation of the users' intention to use the branded gamified app in the future, and 67.7% of the variation of the users' loyalty towards the brand that owned the gamified app (Table 2.4). Furthermore, all Q^2 values for all endogenous constructs were positive, verifying the predictive accuracy of the model (Hair *et al.*, 2019). The estimated model had an acceptable fit since the standardised root mean square residual (SRMR) was 0.050 (Henseler *et al*., 2014). Regarding the significance of the control variables, the education level increased behavioural intentions (β = 0.098, t = 2.407) but decreased CBE (β = –0.097, t = 2.414). Frequency of usage was positively and significantly connected to CBE (β = 0.083, t = 2.065), loyalty (β = 0.074, t = 2.088), and behavioural intentions (β = 0.101, t = 2.250), while age did not have a significant influence on these variables. The results of the structural model are summarised and presented in Table 2.4.

Table 2.4. Structural model results

Structural relationship	β	t-value	p-value	Hypothesis testing
H1: Gameful experience → LOY	0.053	0.993	0.160	Rejected
H2: Gameful experience → INT	0.275	3.859**	0.000	Accepted
H3: Gameful experience → CBE → LOY	0.275	5.546**	0.000	Accepted
H4: Gameful experience → CBE → INT	0.056	1.985*	0.024	Accepted
H5: SIC* Gameful experience → CBE	-0.137	4.486**	0.000	Rejected
H6: SIC* Gameful experience → LOY	0.024	1.033	0.151	Rejected
H7: SIC* Gameful experience → INT	0.130	4.025**	0.000	Accepted
R^2 (CBE) = 0.498; R^2 (INT) = 0.465; R^2 (LOY) = 0.677				
Q^2 (CBE) = 0.369; Q^2 (INT) = 0.391; Q^2 (LOY) = 0.518				

Note: Brand loyalty (LOY), intention to use (INT), customer-brand engagement (CBE), self-image congruity (SIC). *p<0.05, **p<0.01. Analysis was run at 5% significance level.
Source: Created by authors.

2.5.2.1. Hypotheses testing: direct effects

Contrary to our original expectations, the results revealed that the gameful experience had a positive but insignificant direct impact on the brand loyalty variable (LOY) (β = 0.053, t = 0.993), leading to a rejection of H1. However, the gameful experience positively and significantly impacted users' intentions to use the branded app (INT) (β = 0.275, t = 3.859), providing empirical support for H2.

2.5.2.2. Hypotheses testing: the mediating role of customer brand engagement

First, mediation analysis was performed to estimate the relationship between GAMEX and LOY. The results indicated a mediating role of CBE between GAMEX and LOY (β = 0.275; t-value = 5.546). Since the direct effect of GAMEX on LOY was not significant (β = 0.053; t-value = 0.993), this result showed that CBE fully mediates the influence of users' gamified experience on LOY. Second, regarding the mediated relationship between gamified experience and behavioural intentions through CBE, estimations also revealed that the indirect effect is positive and significant (β = 0.056; t-value = 1.985). In this sense, the direct effect of GAMEX on INT was still significant, which suggests that CBE partially mediated the relationship between GAMEX and INT. These results led us to accept both H3 and H4.

2.5.2.3. Hypotheses testing: the moderating role of self-image congruity

A two-stage approach was used to calculate the moderating effects of SIC (Henseler and Chin, 2010). Contrary to our expectations, results showed that the interaction of

SIC and GAMEX on CBE (β = –0,137; t-value = 4.486) was negative and significant. Thus, GAMEX had a stronger impact on CBE for users with low levels of SIC; therefore, hypothesis H5 is rejected. In addition, no significant interaction was found between SIC and GAMEX in explaining LOY (β = 0.024; t-value = 1.033). This result led us to reject H6. However, the effect of GAMEX on INT was positively moderated by SIC. The interaction showed a positive and significant path (β = 0.130; t-value = 4.025). This suggests that the effect of GAMEX on behavioural intentions increased for users who present higher levels of SIC; therefore, H7 is accepted.

2.5.2.4. Post hoc analysis: estimation of an alternative complementary model

To further explore the model's implications, post hoc analysis of an alternative complementary model was performed. This model included the dimensions of GAMEX as first-order constructs and retained CBE as a second-order construct. Therefore, the individual effects of the GAMEX dimensions on CBE, LOY, and INT could be further explored. Consistent with the results of the baseline model, only APPACT significantly influenced LOY at $p < 0.10$ (β = 0.104; $p < 0.10$). ANA (β = 0.162; $p < 0.01$) and particularly ENJ directly, positively, and significantly increased INT (β = 0.456; $p < 0.01$). In addition, the estimation of the specific indirect effect showed that CBE mediated the influence of AB (β = 0.114; $p < 0.05$), DOM (β = 0.061; $p < 0.10$), ANA (β = 0.074; $p < 0.05$), and ENJ (β = 0.130; $p < 0.05$) on LOY (β = 0.012, $p < 0.5$). In predicting INT, CBE significantly mediated the influence of ANA (β = 0.032; $p < 0.05$), ENJ (β = 0.038; $p < 0.05$), and AB (β = 0.034; $p < 0.05$).

Regarding the moderating effects, the estimations revealed that the interactive effect between SIC and APPACT on CBE was negative and significant (β = –0.198; $p < 0.05$) and that the interactive effect of SIC and AB on INT was positive and significant (β = 0.149; $p < 0.01$). These results are in line with those found in the baseline model but were able to further specify which specific elements of GAMEX were moderated by SIC.

Overall, the estimation of this complementary model reinforces the findings of the baseline model and provides additional insights into which particular dimensions of GAMEX determine the dependent variables. However, the interpretation should be taken with caution since the fit of the model is close to the critical suggested thresholds, given the large number of constructs and relationships in the model (SRMR = 0.083).

2.6. Discussion

2.6.1. Theoretical implications

This study contributes to a better understanding of the gamification and technology literature by proposing a novel model that explores the impact of gamification on loyalty in the context of branded applications. The findings reveal a positive chain of connection between gamification, CBE, brand loyalty, and intentions to use the gamified app. Furthermore, the impact of these relationships appears to be influenced by users' levels of SIC related to the focal activity of sports. The results yield significant theoretical insights.

First, this study draws on the Stimulus-Organism-Response (SOR) model and validates the role of the gameful experience as an external stimulus that influences customer brand loyalty and behavioural intentions to use the app (response) through CBE (organism). As a result, this research extends the applicability of the SOR model to the fitness and sports gamified apps. Additionally, the study contributes to the existing body of technology literature by providing further evidence of the significant impact of education levels on technology adoption and usage. The findings demonstrate that higher education levels are associated with increased behavioural intentions, indicating that individuals with higher education are more likely to engage with the branded gamified app and continue using it. This finding aligns with previous literature (Billon *et al.*, 2021; Riddell and Song, 2017).

Second, a critical contribution of this study lies in the non-significant direct influence of the gameful experience on brand loyalty, challenging initial expectations. The findings suggest that users require more than a successful and enjoyable interaction with the gamified system to develop loyalty towards the brand. As indicated in prior research, the use of game mechanics helps deliver a customisable journey to users (Tu *et al.*, 2019), which may increase their continuance intentions but does not necessarily foster brand loyalty. While it was expected that the gameful experience would have a positive influence on brand loyalty (Al-Zyoud, 2021), this finding could also imply that consumers in the fitness and sports sector may expect additional game elements integrated into their journey to establish loyalty, rather than solely relying on the presence of an enjoyable gamified experience.

Furthermore, a post hoc analysis reveals that only the APPACT dimension of the GAMEX scale demonstrates a significant direct influence on brand loyalty. This finding can be attributed to the co-creative nature of the gameful experience (Huotari and Hamari, 2017). When a gamified branded application offers users an intuitive journey with personalised communication, enabling them to schedule, track activities, and set goals, it fosters a sense of participation in creating the experience and a sensation of activation within the branded app. This emotional connection enhances the relation between the user and the brand, and in turn, their loyalty to it. Therefore, aspects such as value co-creation resulting from the experience with branded applications positively influence brand loyalty (Fang, 2019) and contribute to its enhancement (Adhikari and Panda, 2019).

Third, another key contribution of this study is the direct impact of users' gameful experiences with a branded application on their intentions to continue using it in the future. Consistent with previous research (Bitrián *et al.*, 2021; Tu *et al.*, 2019), the gameful experience enhances users' willingness to engage with the system on a regular basis. Interestingly, the post hoc analyses highlight the crucial role of the ENJ and ANA dimensions in predicting continuance intentions. Specifically, enjoyment represents the fun, playful, and entertaining interactions users have with the app, which are essential for bringing them back to the app. When users experience positive emotions while interacting with the app, it generates a sense of delight and reduces anxiety and concern, significantly influencing their acceptance and adoption of the branded app (Faqih, 2022; Hsieh *et al.*, 2021). Similarly, when users do not encounter negative emotions during their interactions, they are more inclined to continue using the app in the future. Therefore, these two emotional dimensions of the gameful experience serve as critical and direct predictors of users' behavioural intentions.

Fourth, a significant contribution of this study is the identification of CBE as a key mediator in the relationships between the gameful experience and user responses in branded gamified apps. This finding aligns with previous research in various application contexts, such as online banking (Islam *et al.*, 2020), brand communities (Duong *et al.*, 2020; Islam and Rahman, 2017), and travel (Ali *et al.*, 2021). The study demonstrates that CBE fully mediates the relationship between the gameful experience and brand loyalty, and partially mediates the relationship between the gameful experience and behavioural intentions. These results reinforce the notion that

gamification in mobile applications plays a crucial role in engaging users with the brand (Abou-Shouk and Soliman, 2021; Bitrián *et al.*, 2021, Xi and Hamari, 2020). The use of gamified features can trigger individuals' affective, cognitive, and behavioural engagement with the brand, fostering stronger brand ties, and motivating continued app usage. On the one hand, total mediation on brand loyalty, as initially suggested, indicates that a gamified experience requires that customers be engaged with the brand to eventually create brand loyalty. On the other hand, partial mediation suggests that beyond its direct effect, CBE explains how the gamified experience influences users' behavioural intention. Furthermore, the analysis of the first-order constructs reveals that aspects such as AB, ANA, and DOM influence CBE, which, in turn, drives brand loyalty. At the same time, AB, ANA, and ENJ contribute to enhancing the intention to use the branded app in the future through CBE.

The aspect of dominance allows users to exert active control and autonomy when using the branded application (Hsieh *et al.*, 2021). This enables them to take full ownership of their interactions with the app and brand-related content. This sense of ownership, in turn, enhances users' level of engagement with the brand, fostering a closer connection and leading to higher levels of brand loyalty and a stronger intention to use the app in the future. Additionally, the immersive nature of the gameful experience helps users escape reality and minimize distractions, keeping their attention and engagement focused on the app (Ryan *et al.*, 2006). This, combined with the absence of negative emotions, empowers users and cultivates a higher level of brand engagement, leading to more loyalty.

Fifth, this study contributes to the gamification and branding literature by expanding the scope of the SOR model to include the role of SIC. Surprisingly, the results reveal that the gameful experience leads to weaker engagement for users with high levels of SIC in sports. This could be attributed to the fact that individuals with low SIC become more interested in sports and curious about the brand during a successful gameful experience. This means that when users understand how the brand fits their image, and how it reflects who they are, they are more likely to engage with it (Chen and Pu, 2014). Additionally, we speculate that to users for whom sports do not play a crucial role in forming their self-image, elements like the thrill of discovering a new passion for the first time keep them active and engaged in a more pronounced way than for those who already deeply care about sports and consider them part of their lives.

Moreover, contrary to our expectations, the moderating effect of SIC on the gameful experience and brand loyalty was found to be non-significant. This result suggests that brand loyalty requires more than just interactions with gameful experiences, whether the users identify with sports or not! Finally, the study demonstrates that the impact of the gameful experience on the intention to use a gamified branded application in the future is stronger for individuals with high SIC, particularly in terms of the absorption dimension of the branded app. For these users, and considering what sports represent to them, the gamification elements are more easily accepted since it allows them to efficiently achieve their personal goals and reinforce their image (Lim *et al.*, 2016). Thus, gamification will keep these users more motivated to continue their exercise regimen and, therefore, this drive reinforces their self-concept. Individuals with high SIC are interested in sports because they help them maintain their image and character, and one way of showcasing this to others is by continually using their branded gamified application. This result is also in line with recent studies that found that the inclusion of gamification features, focused on fostering utilitarian values, can exert a stronger influence on consumer responses than social or emotional elements in the context of branded apps (Torres *et al.*, 2022).

2.6.2. Managerial implications

This study carries significant implications for app designers and marketing managers seeking to implement gamification strategies in branded apps. First, this research highlights the importance of shifting the focus from thinking only about gamification in terms of game elements to focusing more on the significance of the experience-centred approach. In this sense, marketers should recognize the value of co-creating gameful experiences with their customers, involving them in the design process and encouraging their contributions to the development of interactions and touchpoints. By establishing a partnership with customers throughout the design phase, rather than solely involving them in testing, marketers can gain novel perspectives and valuable feedback. Consequently, this collaborative approach will not only save time and money for managers before product launch, but it will also ensure the ultimate success of the gameful experience by making it customer centered.

Second, this study provides valuable insights for managers seeking to understand how gamification can boost loyalty towards their brands in the sports and fitness sectors and encourage continuous use of their branded gamified apps in the future. While

many organisations have successfully utilised gamification to enhance customer engagement, retention, and loyalty (Eisingerich *et al.*, 2019), other firms have struggled and failed to deliver effective gameful experiences. To address this challenge, organisations require deeper insights into the factors that drive customer engagement with gamified systems. Therefore, the findings of this study serve as a comprehensive guide for gamification and gameful experience designers, shedding light on the key determinants of user behaviours and attitudes in the sports and fitness industry.

With respect to this, the significant finding that the gameful experience did not have a direct effect on brand loyalty, except for its activation dimension that was found to be significant, may be of particular interest to marketers is with only activation demonstrating significance. Therefore, gamified applications should be designed to stimulate users' activation and excitement during the app interactions. This can be achieved by incorporating gamification elements that provide users with a sense of progress (e.g., progress bars, points, badges) and offer brand-related rewards upon reaching specific milestones or attaining specific status within the app. For example, marketers can incentivize users' daily check-ins through a points system, and once users reach a certain milestone, they can receive promotional offers or exclusive discounts to use for brand-related purchases. Furthermore, the results of this study align with previous research (Eppmann *et al.*, 2018) in demonstrating that enjoyment and the absence of negative affect directly influence users' intentions to continue using the branded app in the future. Therefore, gamified app designers should prioritise creating pleasurable and emotionally engaging experiences by improving the app's design and enhancing its hedonic value. This can be achieved by enhancing visual attractiveness through the use of colours, shapes, and animations, as well as integrating game elements such as avatars that reflect different emotional states based on the user's activity (e.g., a happy avatar if the individual has been using the app regularly). Additionally, brands can leverage the power of narratives and storylines to further enhance user enjoyment.

Third, it is crucial to design gamified applications that foster user engagement with the brand. This study uncovers the mediating role of customer-brand engagement (CBE) in the relationship between gamification and customer loyalty. Therefore, marketers should emphasise the importance of designing gameful experiences that cultivate a

sense of connectedness between the users and the brands. This connection can be established by incorporating engaging stories and immersive environments that position the brand and the user as central characters within the narrative. Furthermore, app designers should integrate gamified elements that empower users to enhance their feelings of dominance and control. One approach is to invite users to co-create their journeys within the branded gamified application. For instance, enabling personalisation options may provide users with a sense of increased dominance perception and encourage frequent interactions with the app. Additionally, incorporating a social platform within the gamified app, where users can share their feedback on challenges, propose workouts, or provide reviews on the brands' products and services, can enhance users' perceived freedom to act, leading to a heightened sense of dominance. Considering these reasons and that users may encounter the gamified branded app as their first interaction with the brand before moving towards the consumption stage, it is crucial to deliver a positive and enjoyable initial experience. This will foster positive emotions that can ultimately drive brand engagement and favourable outcomes. In summary, CBE plays a central role in this research, particularly in a time when delivering value and quality alone is considered the bare minimum for companies to thrive. Therefore, marketers should explore ways to sustain the interaction between the user and the brand, beyond usefulness and utility. Accordingly, gamification serves as a solution and catalyst, enabling increased brand value through insights, innovation, and successful user experiences, ultimately leading to breakthrough performance results.

Lastly, it is essential for marketers and app designers to develop gamification strategies that actively promote consumer engagement, not only through the gameful experience itself but also in alignment with the individuals' self-image congruity (SIC). Based on the findings of this study, marketers and brand managers should design gamified apps that evoke emotional, cognitive, and activation-related responses from customers while also catering to their psychological needs. However, it is worth noting that higher levels of SIC with a particular activity can diminish the impact of the gameful experience on CBE. Hence, it is crucial for marketers and designers to explore options to better tailor gamification based on users' profiles, taking into consideration their level of SIC with the focal activity. By doing so, they can ensure that brand engagement is not compromised for users who possess a higher level of SIC.

2.6.3. Limitations and further research

This study is not free of limitations that could lead to future research opportunities for scholars. First, this study tested the proposed model using data from several applications focused only on the running and/or working out disciplines. Future studies can apply the proposed model to other types of sports to understand if the delivered gameful experience changes depending on the practiced activity or whether it is individual or collective – and to comprehend better what drives brand loyalty and behavioural intentions, to expand the literature on branded applications. Another possible research endeavour can be to investigate if the level of expertise (beginner to advanced) of the sports and fitness app users impacts their engagement and behavioural outcomes. This type of research will contribute to understanding the various factors that can impact the gameful experience based on the environment where it occurs and the sports expertise of its users. Second, the target sample of this paper included active users of branded fitness and sports applications. Therefore, future studies could examine the impact of the gameful experience on marketing and behavioural outcomes in non-branded apps (e.g., Strava, Zombies, Run!) to understand better the dimensions and variables that drive these outcomes within these communities.

Additionally, exploring the differences in user goals for using these branded gamified apps can provide future guidelines for academics, brand owners, and managers to help determine the triggers of the gameful experience and behavioural intentions. Furthermore, a comparative study of branded and non-branded applications regarding the delivered gameful experience and behavioural outcomes could be a particularly interesting research project. Third, the current research used convenience sampling to collect data. Therefore, to generalise this study's findings to the overall population of interest, future research will find it interesting to replicate the same model using probability sampling to select their participants. Fourth, the data was obtained using a self-administered questionnaire. Therefore, measuring the gameful experience's impact using subjective and objective measures could be worthwhile. Future studies could also combine this methodology with data gathered directly from applications' mechanisms to deepen the understanding of the users' perception of the gameful experience. Finally, while this study applied the GAMEX scale from Eppmann *et al*. (2018) to analyse the gameful experience derived from gamification, future studies

could use alternative frameworks and scales to strengthen understanding of the gameful experience's behavioural effects in the sports and fitness industry. For example, recent studies have suggested looking into the disaggregated elements of the GAMEX scale and their heterogeneous paths of influence on consumer engagement and behaviour. The utilitarian value of an app, frequently connected to its core functional elements (task completion or challenge achievement), may not always elicit emotional responses from app users. In contrast, hedonic values induce strong emotional reactions that precede brand loyalty (Torres *et al*., 2022) and continuance intention to use (Luo *et al.*, 2023). Finally, this study is based on the premise that the experience with a gamified technology can elicit favourable outcomes also at the brand level. Future studies should expand this connection by further considering the impact of the gameful experience on the users' engagement with the branded gamified app. The causal connections between the gamified experience and the users' engagement at the technology level should also be considered as an alternative source to generate technology and brand-based positive outcomes. This study would clarify how customers could be more engaged with a brand as a result of interacting with a gamified branded app via technology engagement.

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Chapter 3:

3. App-solute impact: how mobile technology shapes event experiences and attachment to places

Chapter 3 represents the second article of this thesis. Its focus lies in the exploration of the impact of app technologies on driving event experiences. Subsequently, it delves into understanding participants' behaviours, encompassing their connection to the event's location through place attachment, as well as their engagement with the event itself. Behavioural intentions such as word-of-mouth, electronic word-of-mouth, the intention to participate in the event again, and affective commitment are central components of this investigation.

3.1. Structured Abstract

Research question: The sports literature has witnessed a noticeable increase in research examining the impact of app technology on driving consumers' behaviours. However, most of these studies only scratched the surface of the complex nature of this relationship, without fully exploring its facets through the lens of event experiences. Consequently, the present study aims to address this research gap by exploring the impact of app technology on event experiences, and subsequently on consumers' behaviours, namely place attachment, affective commitment and behavioural outcomes.

Research methods: Data was collected during the 12th edition of the Transpyr Coast to Coast race in 2022, from 219 international participants.

Results and Findings: The study found that users' satisfaction with the app was positively related to perceived usefulness, perceived information value, and enjoyment of the app. However, perceived ease of use did not directly influence satisfaction. App satisfaction positively impacted event experiences, leading to place attachment, behavioural outcomes (intention to participate, word of mouth, and electronic word of mouth), and affective commitment. Additionally, affective commitment positively influenced behavioural outcomes, while place attachment did not have a significant effect on them.

Implications: This study presents a novel model bridging the gap between technology and event experiences. It offers a new perspective on the TAM model by measuring users' online experience with the app and its impact on event experiences. The findings provide guidelines for event organisers and marketers to create successful experiences that positively influence participants' behaviours.

Keywords: Affective Commitment, App Technology, Event Experience, Place Attachment, Sport Consumer Behaviour.

3.2. Introduction

In the last decade, technology has significantly altered the way in which events are organised and experienced (Ramesur and Bekaroo, 2020). The increasing ubiquity of mobile devices and the exponential growth of app technology have created a new paradigm for event organisers who are leveraging these tools to provide attendees with more engaging and interactive experiences. The global event apps market size is forecasted to grow from 1.20 billion in 2022 to 2.64 billion dollars by 2028 (The Insight Partners, 2023), reaching a growth rate of 14%. Parallelly, the sports' events industry is expected to reach a market volume of 32.26 billion dollars by 2027, resulting into an annual growth of 2.72% (Statista, 2023).

In line with this, the sports event industry has embraced this technological shift, with event apps playing an increasingly prominent role in enhancing the participants experiences. The use of mobile apps during events has become increasingly popular, as they offer a convenient platform for participants to access information, engage with other users and the event itself, and participate in various other activities. These apps also provide an opportunity for event organisers to collect data on participants, enabling them to tailor their services to meet the specific needs and preferences of their audiences. In doing so, event apps can help organisers to create a more memorable and enjoyable experience for attendees, while also increasing their overall satisfaction and loyalty (Li *et al*., 2019).

Despite the benefits of mobile technology in shaping event experiences, little is known about its significance in the sports' industry, specifically in the context of events. The existing literature on this topic still reveals various gaps that need to be addressed. First, previous studies focused mainly on measuring the impact of sports apps features on improving the users' performance (Liu *et al*., 2023; Frevel *et al*., 2022), instead of capturing the impact on the overall experience and behavioural responses. Second, they investigated the effect of apps technology from a wearable' point of view, focusing particularly on devices technology and how they drive various behaviours (Liu *et al*., 2023). And finally, the rest of the studies explored the effect of experiences from a design features' level and social factors' one on specific behavioural outcomes such as destination image (Xia *et al*., 2018) and users' continuance intention (Song *et al*., 2021). Therefore, previous scholarly works have predominantly focused on either investigating the influence of app technology on behavioural outcomes in the context

of sports, or on exploring the impact of experiences on these outcomes. Meaning that these two relationships have been examined independently, without considering their interconnectedness. Funk (2017) has pinpointed that future research needs to study the experience provided by the sport organisation as a multitude of two-way interactions along the entire sport consumer journey, rather than being solely transactional.

As a response to these gaps, this paper proposes a comprehensive research model connecting the app technology literature to the event experience one. More specifically, this study aims to respond to the central question on how the technological characteristics of an event-related mobile app can be leveraged to optimise the participants' experience during an event, and in turn, to drive favourable outcomes. To accomplish this, on one hand, this paper aims to investigate the determinant factors influencing the users' satisfaction with the used app during a sports event, by extending the TAM model to include not only the perceived ease of use and perceived usefulness, but also the perceived information value and the enjoyment of the app, considering the nature of cycling events. On the other hand, it seeks to uncover the influence of this satisfaction on driving an effective event experience that could be translated into more favourable behavioural-related outcomes such as affective commitment (Allen and Meyer, 1990), behavioural intentions (Matute *et al*., 2016), and place attachment (Palau-Saumell *et al*., 2019). The study contributes to the existing body of research by highlighting the importance of event apps in the sports industry, and by providing insights into the ways in which these apps impact the users' experiences with the physical event. This will contribute to extending the consumer behaviours' literature and to validating the role of the extended TAM model in the sports' literature. The practical findings of this study have also important implications for event organisers, technology providers, and researchers in the sports industry, and will inform the development of their future event apps designed to enhance their participants experiences.

3.3. Theoretical background

3.3.1. Event experience

Event experiences refer to the extraordinary experiences created and curated during events and festivals (de Geus *et al*., 2016). According to previous studies, events are acknowledged as a significant motivator of tourism attraction, especially for

participants, their families, relatives, and fans (Getz, 2008). Consequently, event experiences and tourism experiences entail comparable encounters and sensations. They encompass more than the core activity to include the overall feelings, emotions, and perceptions that individuals have during a specific event, such as a concert, a sports event, or a festival (Getz, 2005), resulting into their deliberate engagement with the planned activities (Chen *et al*., 2014). This suggests that event experiences are characterised by their focus on creating unique, memorable and personal experiences that engage participants in a multisensory and emotional way (Richards, 2017). Driven by their inherent uniqueness, these experiences hold a magnetic appeal that distinguishes them from traditional attractions, offering attendees a sense of escape from their daily routines (Getz, 2005). For this reason, scholars have characterised these experiences as transformative, as it implies the participants' transition to unlocking new dimensions of behaviours and emotions that take them away from their daily lives (Getz, 2005; Pine and Gilmore, 1998). This immersive setting contributes to creating a shared bond with the event (Morgan, 2008), leading to an array of outcomes that profoundly and emotionally affect the participants (Kirillova *et al*., 2017). Additionally, some researchers have posited that social interactions play a central role in shaping the event experience (Arnould and Price, 1993). These interactions can also lead to unplanned and beneficial emergent outcomes (Lee *et al*., 2016), ranging from emotional and sensorial, to behavioural (de Geus *et al*., 2016).

The sport experience, as a subset of event experience, incorporates diverse interactions between the sport consumer and the event (Funk, 2017). Therefore, researchers need to investigate this interaction and its impact on driving certain actions such as affective commitment towards the event, attachment to the place, and behavioural intentions. For this reason, this study measures the event experience using Kang and Gretzel's (2012) conceptualization of experience composed by three main dimensions: learning, enjoyment, and escape (Forgas-Coll *et al*., 2017). Accordingly, learning refers to the acquisition of new knowledge, skills, or insights through participating in an event (Pearce, 2005). Enjoyment of the experience refers to the pleasure and fun that individuals derive from participating in an event (Davis *et al*., 1992), this includes positive emotions such as happiness, excitement, and joy. And escape refers to the act of seeking relief from daily life difficulties by retreating into an immersive environment (Pearce, 2005). These dimensions can be applied to the

context of a sports event such as a cycling race. For example, participants may learn about various aspects related to cycling, such as proper techniques for bike handling or strategies for efficient pacing. They may also gain knowledge about the race route, its challenges, and the surrounding environment. Learning in this context empowers participants to improve their cycling abilities which would enhance their overall experience. As for the enjoyment dimension, participants may experience a sense of exhilaration and fulfilment as they push their limits, surpass personal goals, and celebrate achievements. The thrill of racing, the camaraderie among fellow participants and the sense of personal accomplishment can contribute to the overall enjoyment of the event. Finally, participants may use the cycling race to temporarily escape from work-related stress, personal challenges, or routine responsibilities. By immersing themselves in the race environment, they can shift their focus, clear their minds, and find a sense of freedom. The intense physical exertion and concentration required during the race augments the participants' engagement, thereby contributing to an immersive and captivating experience.

3.3.2. The interplay between satisfaction with an event-related mobile application and event experience

The events industry has gained a distinguished reputation for its ability to effectively adapt to dynamic environmental changes (Robertson *et al*., 2015). This adaptability is consistently aimed at exceeding the expectations of attendees by creating memorable and engaging experiences (Neuhofer *et al*., 2020). A pivotal approach employed in accomplishing this objective involves the adoption and integration of emerging technologies such as event mobile apps (Solaris, 2018). In this sense, event technologies refer to the use of technology, encompassing both hardware and software, within the context of a live event (Solaris, 2018). These technologies play a facilitative role in engaging attendees, planning the event and delivering successful experiences (Solaris, 2018). Given this consideration, the event landscape offers a wealth of examples that demonstrate how event organisers leverage event apps to elevate attendees' experiences (Eventbrite, 2023). Extant scholarly literature has also corroborated the correlation between event technologies and event experiences (Buhalis *et al.*, 2023; Gretzel, 2011; Neuhofer *et al*., 2014). For example, Van Winkle *et al*. (2016) found that the use of mobiles can enhance the participants' experiences in festivals. Similarly, Buhalis et al. (2023) highlighted the importance of fully

leveraging the emerging capabilities and opportunities of the Metaverse to drive seamless events experiences as a research direction for the tourism industry. Additionally, Martin and Cazarré (2016) probed that effectively leveraging technology can render an event experience to become more remarkable, personal, and memorable, leading to higher levels of satisfaction and loyalty (Tung and Ritchie, 2011; Yoon *et al*., 2010). In this sense, the concept of satisfaction can be considered as the emotional state that results from how users cognitively assess the difference between their expectations and a technology's performance, which can lead to either positive or negative feelings towards the technology (Bhattacherjee, 2001). Authors such as Chang (2015) defined customer's app satisfaction as the overall perception that users have while using mobile applications. This perception is influenced by various factors such as utility, hedonism, or social factors and measures how users perceive the system based on their experience with it (Lin and Wang, 2006).

Prior studies suggest that app satisfaction can increase participants assessment of an event (Li *et al*., 2019; Talantis *et al*., 2020). A well-designed app that answers the users' needs and expectations can enhance their overall experience with the event (Luxford and Disckinson, 2015). For instance, Luxford and Dickinson (2015) highlighted the integral role of mobile apps in enhancing the users' event experience during music festivals and found a positive correlation between the overall users' satisfaction with the official app of the event and their event experience. Similarly, Li *et al*., (2019) found that the emotional response elicited from using a festival app resulted in an enhancement of the perceived quality of their festival experience. Additionally, Talantis *et al*. (2020) observed that the perceived usefulness of a conference mobile app not only influenced users' attitudes toward the app but also significantly affected their overall conference satisfaction. This relationship has also been corroborated in the context of sport marketing, (Lopez *et al*., 2021). Consequently, it is expected in the context of this study a participants' satisfaction with an event mobile app will increase his/her assessment of the event experience. In line with this, the following hypothesis is proposed:

H1. The participants' satisfaction with the use of an event-related mobile application will positively and significantly affect their event experience.

3.3.3. Drivers of satisfaction with an event-related mobile application

3.3.3.1. The Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a widely recognised framework used to understand user acceptance and usage of technology in information systems (Davis, 1989). TAM emphasises the importance of perceived usefulness (PU) and perceived ease of use (PEOU) in influencing user decisions to adopt and use technology. PU refers to users' beliefs that technology will enhance their performance, while PEOU reflects users' perception of how effortless it is to use the technology (Davis, 1989). Previous research has applied TAM to various sectors, including the MICE industry, hotel services, and branded sports apps (Talantis *et al*., 2020; Huang *et al*., 2019; Won *et al*., 2022). However, limited research has been conducted on the use of events mobile applications. To address this gap, this study employs TAM to investigate users' app satisfaction and the impact of app technology on event experiences in a sports event context.

In the context of mobile apps in sports events, PEOU refers to participants' overall perception of using the app effortlessly throughout the event. When users perceive a technology as easy to use, it enhances their confidence and perception of usefulness (Venkatesh *et al*., 2012). A user-friendly interface and clear instructions can enhance users' evaluation of the technology. In a sports event where the app plays a crucial role, participants expect certain features to be intuitive, leading to an increased satisfaction with the app (Matos and Madeira, 2005). Similarly, PU is defined as participants' overall perception of the app's effectiveness and usefulness, which influences their evaluation of the app. In the context of sports mobile apps, users perceive the app as useful when it provides practical features and valuable information that enhance their experience and performance. Users are more likely to engage and be satisfied with the app when they perceive its usefulness. Thus, increased perceived usefulness significantly impacts users' satisfaction with the app.

In summary, this study builds on the TAM framework to examine users' app satisfaction in the context of a sports event and explores the influence of app technology on event experiences. It hypothesizes that participants' PEOU and PU of the mobile app will increase their assessment of the app. Consistent with the original TAM model, it is expected that PEOU will increase PU. This relationship will be

included as a structural control parameter in the model, without being explicitly hypothesized. Therefore, the proposed hypotheses are:

H2: The participants' perception on the perceived ease of use of an event-related mobile application will positively and significantly affect their satisfaction with the app.

H3: The participants' perception on the usefulness of an event-related mobile application will positively and significantly affect their satisfaction with the app.

3.3.3.2. Extended TAM: Enjoyment and Information Value

Perceived Information value (PIV) and app satisfaction

Perceived information value refers to the advantages associated with obtaining information from a system (Li and Zeng, 2011). To assess the value and quality of perceived information, three elements should be considered: usefulness, relevance and helpfulness (Li and Zeng, 2011). Users are more likely to perceive information as valuable if it is useful for problem-solving, contributes to informed decision-making, and provides new learnings (Singh and Singh, 2018). Information that is relevant to users' objectives and presented in an engaging manner is also considered highly valuable (Singh and Singh, 2018). Previous research has shown a positive correlation between perceived information value and perceived usefulness (Seddon and Kiew, 1996; Ghasemaghaei and Hassanein, 2016). In this sense, high-quality information coupled with perceived ease of use significantly impacts perceived usefulness, leading to continuous intention to use online services (Ghasemaghaei and Hassanein, 2016). Perceived information value also plays a crucial role in determining users' satisfaction with the application (Alshibly, 2015; Yang and Peterson, 2004). Users who perceive high information value are more likely to be satisfied with the app (Alshibly, 2015; Yang and Peterson, 2004). In this study, perceived information value is measured by evaluating the app's information as valuable and useful in enhancing the event experience. This includes features such as route information, weather conditions, points of interest, accuracy, relevance, and timeliness. When users perceive this information as accurate, relevant, and timely, it increases their comfort, confidence, and preparedness for the event, ultimately enhancing their satisfaction. Clear guidance, route alerts, personalised recommendations, and tracking progress could also contribute to increasing users' satisfaction. Previous research supports the idea that perceived information value influences app satisfaction (Cho, 2019; Kim *et al*.,

2021). Following this logic, it is expected that perceived information value will increase the app's perceived usefulness and users' satisfaction by contributing to fostering positive users' experiences. Therefore, it is hypothesized that perceived information value will increase satisfaction. Its effect on perceived usefulness is included as a control structural relationship in the model. Consequently:

H4. The participants' perception on the perceived information value of an event-related mobile application will positively and significantly affect their satisfaction with the app.

Perceived enjoyment and satisfaction with the mobile app

Perceived enjoyment (PENJ) is a variable typically used in the technology acceptance literature and refers to the pleasurable and fun experiences that individuals perceive when interacting with a technology (Venkatesh *et al*., 2012). It represents the hedonic motivation for using a technology and is separate from practical benefits. Perceived enjoyment is an external variable frequently incorporated into the Technology Acceptance Model (TAM). In the context of this study, perceived enjoyment refers to the positive emotions and feelings that users experience while using the app during the event.

Previous literature emphasised the importance of intrinsic motivations in explaining technology adoption and usage, leading to higher levels of satisfaction (Davis *et al*., 1992, Meena and Sarabhai, 2023). In this sense, technologies frequently include hedonic features that can stimulate individuals' intentions to adopt and use these systems (Chiu and Cho, 2021; Won *et al*., 2022). These features lead to the users' enjoyment, and in turn, to their satisfaction with the technology (Hsiao *et al*., 2016). For example, Lee and Shim (2006) found that PENJ, representing hedonism, has a strong impact on the satisfaction with the mobile business applications. This was explained by the hedonic nature of satisfaction in IS reflecting the feeling of pleasure or displeasure that a user experiences (Lee and Shim, 2006), aligned with the hedonic nature of PENJ. Similarly, Won *et al*. (2022) affirmed that apps should integrate beneficial and well-designed features that will enhance users' experiences in the branded sports apps context. These technical features strongly impact the enjoyment with the app and satisfaction. Therefore, we posit:

H5. The participants' perceived enjoyment of an event-related mobile application will positively and significantly affect their satisfaction with the app.

3.3.4. Consequences of event experiences

3.3.4.1. Behavioural intentions

The impact of event experience on participants' behavioural intentions has garnered substantial scholarly interest during the past years. Behavioural intentions refer to an individual's intentions or plans to engage in a particular behaviour, such as purchasing a product or using a service (Warshaw and Davis, 1985). In the field of marketing and consumer behaviour, understanding the factors that shape an individual's behavioural intentions is important to predict and influence their actions. It has been expressed in various ways, such as repurchase/revisit intentions, WOM, eWOM, and loyalty (Matute *et al*., 2016; Meeprom and Silanoi, 2020; Palau-Saumell *et al*., 2019). The present study uses behavioural intentions as a higher order construct composed by the intention to participate in the event in the future, the WOM, and the eWOM.

WOM, or word-of-mouth communication, refers to any information about a product or service that is communicated between consumers through personal conversations, phone calls, or other means of interpersonal communication (Moliner-Tena *et al*., 2023). eWOM, or electronic word-of-mouth, refers to the exchange of information about products or services through online platforms, such as social media, forums, and review websites (Matute *et al*., 2016). Positive event experiences can strongly affect participants' behavioural intentions, as indicated by their inclination to engage in follow-up activities (Akoğul and Selçuk, 2024). Participants who have had a pleasant experience during the Transpyr event may feel motivated to share their experiences online, resulting in positive e-WOM. This, in turn, can influence potential participants' decision-making processes, and drive their inclination to engage in similar activities. Additionally, a satisfying event experience can also encourage participants to directly recommend the event to others. Furthermore, participants who have had a positive and engaging event experience are more likely to join future editions, building a sense of loyalty and dedication to the event (Ding and Hung, 2021; Kolar and Cater, 2018). Therefore, based on previous evidence, it is expected that event experience will enhance the participants' behavioural intentions towards the event, leading to the following hypothesis:

H6. The participants' event experience will positively and significantly impact their behavioural intentions.

3.3.4.2. Place attachment

Place attachment and event experience

Place attachment theory is a concept in the field of psychology that refers to the emotional bond or connection that individuals have with a particular physical location (Hidalgo and Hernandez, 2001). This theory is rooted in the idea that individuals develop a sense of identity (1) which refers to a symbolic attachment to a place and a sense of dependency (2) which refers to a functional attachment to a place through their experiences and memories (Williams and Vaske, 2003).

Place attachment theory suggests that people form attachments to places through repeated exposure, positive experiences, and the formation of personal meanings and memories associated with the place (Manzo, 2005). Events can have a significant impact on place attachment by altering the meaning and emotions associated with a place. For example, events can have a positive impact on place attachment by increasing feelings of community, promoting local pride, and providing opportunities for social interaction and connection (Scannell and Gifford, 2010). Therefore, a successful event can enhance an individual's attachment to a place by providing positive memories and experiences that are associated with the place. This will create a lasting impression and an emotional connection to the location, generating an affinity for the place and a desire to revisit it in the future. Similarly, Vada *et al*. (2018) found that memorable tourism experiences significantly influence place attachment. Thus, in line with the preceding discussion, the following hypothesis is proposed:

H7. The participants' event experience will significantly and positively impact their attachment to the place of the event.

Place attachment and behavioural intentions

According to Palau-Saumell *et al*. (2019), place attachment plays a pivotal role in driving behavioural outcomes during events, such as participants' inclination to revisit, recommend, and engage in positive word-of-mouth communications about a recreational site. When individuals form a strong connection with a place, they are more likely to return and actively plan to participate in the event again. Place attachment also leads to increased recommendations and favourable reviews, as participants who have a deep attachment to the event's location are more inclined to share their positive experience offline and online (Palau-Saumell *et al*., 2019).

Furthermore, this emotional bond may stimulate the participants' intention to engage in future editions of the event and stay connected with the community, driven by a strong sense of identity and emotional dependency associated with the place (Loureiro, 2014). Therefore, we hypothesise the following:

H8. The participants' place attachment will positively and significantly impact their behavioural intentions towards the event.

3.3.4.3. Affective commitment

Drawing on organisational behaviour research (Allen and Meyer, 1990), marketing literature has defined commitment as the desire to maintain a relationship that binds an individual to an organisation (Shen *et al*., 2018). Allen and Meyer (1990) conceptualized commitment in three dimensions: calculative, affective, and normative. Specifically, affective commitment is an emotional factor that develops through the level of personal involvement between a customer and an organisation, resulting in a higher level of commitment (Guftansson *et al*., 2005). The current research focuses on affective commitment as a determinant of customer retention (Fullerton, 2003), showing more favourable correlations with organisations (Meyer *et al*., 2002), and validation in sport organisations (Rocha and Chelladurai, 2011).

Affective commitment and event experience

Event experience is an essential factor for the development of affective commitment in participants and can be explained by the affective events theory (AET) (Weiss and Cropanzano, 1996). AET suggests that emotions are the main determinants of individuals' attitudes and behaviours in response to events. These emotions are elicited by various sources, such as the event environment, interactions with others, and personal experiences. They can influence individuals' behaviours by creating an emotional bond through the accumulation of positive experiences, leading to outcomes such as satisfaction and commitment (Weiss and Cropanzano, 1996). Customer experiences with brands have been observed to contribute to the creation of affective commitment towards the brand in different product categories (Iglesias *et al*., 2011). Similarly, Ok *et al*. (2020) affirmed that participants' satisfaction with a community running event positively impacts their affective commitment to the event, increasing the likelihood of sustaining their relationship with it. Therefore, it is likely that the

positive experiences participants undergo throughout an event will lead to increased affective commitment towards the organisation:

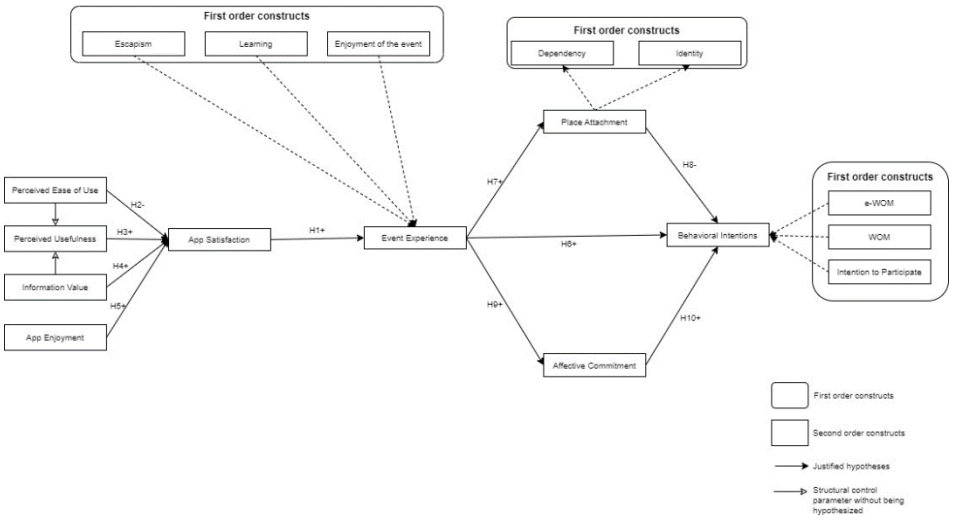
H9. The event experience will significantly and positively impact participants' affective commitment towards the event.

Affective commitment and behavioural intentions

Previous studies indicate that individuals with a high level of affective commitment exhibit positive behavioural intentions towards the event (Maduku *et al*., 2023; Ryu and Park, 2020). First, regarding word-of-mouth communication, when individuals develop a strong emotional bond and a deep sense of loyalty towards an event, it acts as a powerful motivator for them to engage in positive communications, both online and offline (Ryu and Park, 2020; Maduku *et al*., 2023). Second, regarding the intention to participate in future editions, participants with a strong affective commitment may develop a deep sense of loyalty towards the event, serving as a strong driving force to continue their involvement. Although little is known about this relationship in the sports context, it has been proven in brand communities that consumers with a strong commitment to the brand are more likely to support its products and engage with its community (Muniz and O'Guinn, 2001). Additionally, this commitment acts as a predictor of their purchase intention and willingness to spend more money on the brand's products (Dijkmans *et al*., 2015). Following this logic, it is predicted that participants who share an affective bond with a sport event are also more likely to engage in communication activities with the event's environment and participate in future editions. Therefore, we hypothesize that:

H10. Participants' affective commitment towards the event will positively and significantly impact their behavioural intentions. The hypotheses proposed above are represented in Figure 3.1.

Figure 3.1. Research model



3.4. Methodology:

3.4.1. Research context

The research model was tested in the context of use of a mobile app within a sports event. More specifically, the app selected for this study was the official route sponsor of the event, Komoot. Komoot is a popular outdoor navigation and planning application designed for cycling, hiking, and other outdoor activities. This app was used by all the participants during the 12th Transpyr race that took place in June 2022. Transpyr is an annual sporting event that happens in the Pyrenees Mountains, between the south of France and the north of Catalunya. It is a competition that covers a distance of approximately 1,000 km and is considered one of the most challenging cycling races in the world (National Geographic España, 2023). The event attracts both amateur and professional cyclists and takes place over seven stages, with each stage covering a different section of the Pyrenees, passing through historic villages and crossing high mountain passes. The race is designed to offer a comprehensive experience for participants including support services such as bike mechanics, medical teams, and feeding stations along the route. Komoot was used during Transpyr, to plan the routes for the participants and to provide them with personalised, turn-by-turn voice

navigation, along with detailed topographic maps and insights into elevation changes, surface types, difficulty level and more, online and offline.

3.4.2. Procedure

The data was collected using a printed survey targeting all the Transpyr participants from the 12th to the 17th of June 2022. The collection was done in-person, and the questionnaire was developed in English, but English-to-French and English-to-Spanish translations were available to ensure that all respondents understood the content of this study, despite language-specific differences (e.g., interpretation and nuance). A copy of the questionnaire is provided in the appendix (Appendix B). After data screening, incomplete and non-valid questionnaires were removed, a total of 219 answers were considered valid. Most of the respondents (37.9%) were aged between 46 and 55 years old and were men (91.3%). Most of the respondents were using the app for more than 2 years (57.5%) and around 3 times a week (39.7%).

3.4.3. Questionnaire design and measurement

The study used seven-point Likert scales (ranging from 1= strongly disagree to 7= strongly agree), derived from validated instruments from prior studies.

The behavioural intentions of respondents were conceptualised as a second-order construct composed by three first-order latent variables: word-of-mouth measured by the Sisson and Whalen (2022) scale, electronic word-of-mouth measured by Serra Cantallops *et al*. (2018) scale, and intention to participate measured by Algesheimer *et al*. (2005) scale. Attachment to place was also measured as a second-order construct, consisting of two dimensions, specifically dependence and identity, following Palau *et al*. (2019) scale. Perceived ease of use and perceived usefulness were measured by items adapted from Kim *et al*. (2007) and Davis (1989). Additionally, perceived information value was evaluated using Li and Zeng (2011) scale. The event experience was assessed on three levels, namely learning, enjoyment and escape, using the Kang and Gretzel (2012) scale. Furthermore, the app satisfaction was measured using items adapted from Li *et al*. (2019). Finally, to measure affective commitment, three items were adapted from Sisson and Whalen (2022).

3.4.4. Common method bias assessment

The present study relied on collecting data from a one-time survey. Therefore, the common-method bias had to be addressed on a procedural and statistical basis (Podsakoff *et al*., 2003). First, with reference to the procedure, all participants were given the voluntary option to participate in the study and were assured of their anonymity and the confidentiality of their data. This lessens the likelihood of dishonesty or artificial answers from the respondents (Podsakoff *et al*., 2003). Second, the dependent and independent variables were randomly presented to avoid that the respondents draw the cause-and-effect links between the constructs. Third, since the data collection took place in-person, participants were guided and had their questions and doubts answered, which contributed to filling the questionnaire in a thoughtful and thorough manner and making sure to finish it completely. Fourth, a full collinearity test based on variance inflation factors (VIF) was held to discard any possible bias. The analysis revealed that all the VIF values ranged between 1.309 and 4.268, all lower than 5, which indicates the absence of common method bias from this study (Hair *et al*., 2017).

3.5. Results

The partial least squares structural equation modelling (PLS-SEM) technique with the software SmartPLS 4.0 was used to test the proposed research model. Specifically, PLS was chosen for this study for the following reasons. First, PLS is more suitable for conceptual models that include both formative and reflective variables, which is the case of this study (Hair *et al*., 2011). Second, it is more appropriate when the sample size is lower than 250 (Reinartz *et al*., 2009). And third, PLS provides first-order latent variable scores for follow-up analyses, which was needed in this study (Hair *et al*., 2019).

3.5.1. Measurement model assessment

The event experience in this model is measured as a second-order construct, composed by learning, enjoyment and escapisms first-order dimensions. Similarly, attachment to the place is conceptualised as a second-order construct, made of place identity and dependence first-order dimensions. And last, behavioural intentions was conceived as a second-order construct, reflected by WOM, eWOM and intention to participate first-order dimensions.

To test the proposed model, a two-stage approach took place for the estimation of the second-order constructs (Wetzels *et al*., 2009). During the preliminary first-order estimation stage, the first-order latent variables were assessed as reflective mode-A. As a result of this process, one item was removed from the eWOM construct. In the second stage, and after obtaining the latent variable scores for the first-order constructs, the second-order final measurement model was analysed. Table 3.1 shows the results of the second-stage estimation for the reflective constructs. Again, all the outer loadings were above the recommended threshold of 0.70, therefore, verifying the existence of individual reliability and the latent variable composite reliability for reflective constructs. Additionally, the AVE indicators were above the critical threshold of 0.5, meaning the research model guarantees the existence of internal consistency and convergent validity (Hair *et al.*, 2019). The Heterotrait-Monotrait (HTMT) ratios of the second-order model were all below 0.85 (Henseler *et al.*, 2015), therefore confirming the existence of discriminant validity among the constructs (Table 3.2).

Table 3.1. Reflective measurement model – Stage II

Constructs	Items	Standardised Loading (SD)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Perceived Ease of Use (PEOU)	PEOU1	0.895	0.936	0.830
	PEOU2	0.911		
	PEOU3	0.926		
Perceived Usefulness (PU)	PU1	0.928	0.956	0.844
	PU2	0.931		
	PU3	0.888		
	PU4	0.926		
Perceived Information Value (IV)	PIV1	0.861	0.926	0.759
	PIV2	0.889		
	PIV3	0.843		
	PIV4	0.892		
App Enjoyment (ENJ_APP)	ENJ_APP1	0.897	0.921	0.745
	ENJ_APP2	0.818		
	ENJ_APP3	0.901		
	ENJ_APP4	0.834		
App Satisfaction (SAT_APP)	SAT_APP1	0.933	0.947	0.856
	SAT_APP2	0.939		
	SAT_APP3	0.903		

Affective commitment (COM)	COM1	0.890	0.937	0.832
	COM2	0.921		
	COM3	0.925		
Place Attachment (ATT)	DEP	0.870	0.899	0.817
	ID	0.936		

Source: Created by authors.

Table 3.2. Discriminant validity analysis – Stage II

	1	2	3	4	5	6	7
1. ATT	**0.904**	0.174	0.178	0.209	0.421	0.117	0.201
2. COM	0.147	**0.912**	0.279	0.400	0.558	0.640	0.635
3. ENJ_APP	0.141	0.275	**0.863**	0.295	0.362	0.285	0.681
4. PEOU	0.173	0.359	0.293	**0.911**	0.582	0.607	0.518
5. PIV	0.351	0.507	0.353	0.517	**0.871**	0.526	0.622
6. PU	0.092	0.589	0.285	0.558	0.488	**0.919**	0.551
7. SAT_APP	0.172	0.579	0.639	0.470	0.569	0.512	**0.925**

Note: See Table 3.1 for acronyms. Values in the diagonal represent the root square of the AVE values; Values below the diagonal indicate constructs' correlations; Values above the diagonal are the HTMT ratios.
Source: Created by authors.

Regarding the mode-B estimated constructs, the variance inflation factors (VIFs) were examined with a full collinearity (Hair *et al.*, 2011). As Table 3.3 shows, the resulting VIFs range from VIFs 1.309 to 2.181, thus suggesting that formative indicators for the second-order constructs don't have multicollinearity issues. In addition, external validity was analysed by assessing the indicators' weights. Indicators have external validity when they have statistically significant weight. If an indicator's weight is not significant but the corresponding loading is high (i.e., above 0.50), then the indicator has external validity and should be retained (Hair *et al.*, 2017). In this study, the variable "eWOM" of the behavioural intentions construct exhibited an insignificant weight of 0.020 but a high outer loading of 0.694, exceeding the recommended threshold of 0.50. Therefore, eWOM was retained.

Table 3.3. Formative measurement model – Stage II

Constructs	Items	Weights	T values	VIF
Event Experience (EV_EXP)	LEAR	0.414	4.389	1.786
	ENJ_EV	0.298	3.018	1.630
	ESC	0.486	3.978	1.498
Behavioural Intentions (BI)	INT	0.684	3.982	1.309
	WOM	0.492	4.393	1.976
	eWOM	0.020	0.152	2.181

Note: VIF: Variance inflation factor. **Source**: Created by authors.

3.5.2. Structural model assessment

After validating the measurement model, the structural model was tested using a bootstrapping procedure with 8.000 subsamples (Hair *et al*., 2011). The results showed that the model explained 59% of the variation of app satisfaction, 26.1% of the variation of event experience, 27.2% of the variation of place attachment, 67.2% of the variation of behavioural intentions, and 42.9% of the variation of affective commitment. The endogenous constructs exhibited determination coefficients (R^2) exceeding 10%, indicating sufficient predictive power in the model (Falk and Miller, 1992) (Table 3.4).

Results revealed that SAT_APP had a positive and significant impact on EV_EXP, leading to the support of H1 ($\beta = 0.511$, $t = 5.724$, $p<0.001$). Additionally, and contrary to initial expectations, results showed that the direct effect of PEOU on SAT_APP was positive but not significant, therefore, rejecting H2 ($\beta = 0.084$, $t = 1.151$, $p>0.1$). However, when mediated by PU, this relationship becomes significant (($\beta = 0.086$, $t = 2.368$, $p<0.05$). This result is an indication that PU fully mediates the influence of PEOU on SAT_APP. Furthermore, the findings confirmed the positive and significant effect of PU, IV and ENJ_APP on SAT_APP, thus supporting H3 ($\beta = 0.206$, $t = 2.575$, $p<0.01$), H4 ($\beta = 0.262$, $t = 3.676$, $p<0.001$), and H5 ($\beta = 0.464$, $t = 11.114$, $p<0.001$). Moreover, the data revealed a positive and significant effect of EV_EXP on BI, ATT, and COM, supporting respectively H6 ($\beta = 0.335$, $t = 3.449$, $p<0.05$), H7 ($\beta = 0.522$, $t = 5.705$, $p<0.001$), and H9 ($\beta = 0.356$, $t = 5.215$, $p<0.001$). In addition, ATT does not positively and significantly impact BI, resulting into the rejection of H8 ($\beta = -0.026$, $t = 0.330$, $p>0.1$). However, COM does impact positively and significantly BI, supporting H10 ($\beta = 0.592$, $t = 6.066$, $p<0.001$).

Table 3.4. Structural model results

Structural parameter	β	T values	Hypothesis testing
PEOU → PU	0.417	4.004***	Yes
IV → PU	0.272	2.666**	Yes
H1: SAT_APP → EV_EXP	0.511	5.724***	Yes
H2: PEOU → SAT_APP	0.084	1.151	No
H3: PU → SAT_APP	0.206	2.575*	Yes
H4: IV → SAT_APP	0.262	3.676***	Yes
H5: ENJ_APP → SAT_APP	0.464	11.114***	Yes
H6: EV_EXP → BI	0.335	3.449**	Yes
H7: EV_EXP → ATT	0.522	5.705***	Yes
H8: ATT → BI	-0.026	0.330	No
H9: EV_EXP → COM	0.356	5.215***	Yes
H10: COM → BI	0.592	6.066***	Yes
R^2 (SAT_APP) = 0.590; R^2 (EV_EXP) = 0.261; R^2 (ATT) = 0.272; R^2 (BI) = 0.672; R^2 (COM) = 0.429			

Note: See acronyms in Table 3.1 and 3.3. *p<0.01. **p<0.05. ***p <0.001.
Source: Created by authors.

3.6. Discussion and implications

3.6.1. Theoretical implications

This study examines the influence of app technologies on event experiences and subsequent behaviours in the context of sports tourism events. It extends the Technology Acceptance Model (TAM) to incorporate additional variables related to app technology usage. The research shows that app satisfaction directly affects event experiences and affective commitment. Moreover, event experiences have a significant impact on behavioural intentions, attachment to the event place, and affective commitment. Overall, the findings suggest a positive relationship between app technology, event experiences, and behavioural outcomes. This study has important theoretical implications in understanding the role of app technologies in enhancing event experiences and influencing attendee behaviour during sports tourism events.

First, and contrary to the existing literature, our study reveals a nonsignificant relationship between the perceived ease of use and app satisfaction. This unexpected finding suggests that factors beyond usability play a more significant role in determining the participants' satisfaction with the event app. While the perceived ease of use of the platform is an important factor to consider, as suggested by previous

studies (Chen *et al*., 2022; Rezvani *et al*., 2022), users participating in a sports event may have additional specific expectations from the app. For example, if the app lacks essential functionalities or fails to provide the needed information that will facilitate the participants' journeys during the competition, then they might not be satisfied. Similarly, if the app is slow or experiences technical issues, then this might lead to the disengagement of the users and their dissatisfaction. Additionally, even if the app is easy-to-navigate, a poorly designed interface can negatively impact the overall user experience, leading to their non-satisfaction with the app. In conclusion, while an easy-to-use app is vital, other elements such as functionality, performance, design, content quality, and overall value all play a pivotal role in app satisfaction and should all be considered holistically to guarantee a great user experience.

Second, our study reaffirms previous research, demonstrating the positive and significant relationships between PU, IV, and enjoyment of the app with app satisfaction (Hsiao *et al*., 2016; Kim *et al*., 2021; Rezvani *et al*., 2022). Participants' perceptions of the app's utility, perceived information value, and user experience are crucial factors in determining overall satisfaction. Those who find the app useful for accessing event-related information, facilitating interactions, and providing relevant content are more likely to be satisfied (Kim *et al*., 2021; Rezvani *et al*., 2022). Similarly, higher app satisfaction is reported by participants who find the app enjoyable, engaging, and user-friendly (Won *et al*., 2023). In the context of sports events, participants expect interactive features for tracking distances, elevation, and route mapping, promoting their engagement and enjoyment. They heavily rely on the app for accurate data and real-time updates, while relevant and timely content, such as personalised route suggestions and points of interest, enhances their experience. Failure to meet these expectations may lead to participant dissatisfaction.

Third, one of the most significant contributions of this research lies in the positive and significant impact of app satisfaction on participants' event experiences. Consistent with prior studies, a satisfying app experience enhances participants' overall engagement and enjoyment during the event (Li *et al*., 2019). When participants are satisfied with the app technology, they are more likely to undergo favourable event experiences (Talantis *et al*., 2020). For example, a well-designed app that provides accurate route planning, turn-by-turn navigation, and an offline map accessibility, will allow its users to confidently plan their itineraries and explore points of interest on the

way. Additionally, if the app tracks the users' progress, speed and allows them to monitor their performance, then they are more likely to meet their event goals successfully, leading to a sense of accomplishment. All of these functionalities will contribute to a seamless app experience, leading to the enjoyment of the event, and ultimately a satisfying event experience for the participants.

Fourth, our study reveals that a positive event experience has implications on participants' subsequent behavioural outcomes. Participants who have a positive event experience develop a stronger sense of place attachment, exhibit higher behavioural intentions (such as intention to participate, WOM, and eWOM), and demonstrate greater affective commitment towards the event. These findings suggest that creating memorable and satisfying event experiences is crucial in fostering participant engagement and commitment. A positive event experience, facilitated by a satisfying app technology, can evoke emotional connections with the event space, enhance participants' sense of belonging and identification with the event, and motivate them to engage in positive behaviours such as attending future events, sharing their experiences with others, and advocating for the event.

Fifth and contrary to original expectations, we found a non-significant relationship between place attachment and behavioural intentions. This unexpected result challenges previous assumptions that a strong place attachment directly translates into specific behavioural intentions (Loureiro, 2014; Palau-Saumell *et al*., 2019). This may be justified by the intense nature of the Transpyr event where other factors may be exerting a stronger influence on participants' behavioural intentions, overshadowing the impact of place attachment. These other variables include the events' experience in terms of learning, escapism and enjoyment that impacted positively and significantly the behavioural outcomes. Additionally, taking into consideration the positive relation between the affective commitment and the behavioural responses, this is a sign that even if the event is held somewhere else, participants are more likely to continue taking part in it, regardless the location. Therefore, even if place attachment is an important construct to consider in the context of event experiences, its relationship with specific behavioural intentions may be more complex and influenced by various factors beyond the app technology. Further research is needed to explore the underlying mechanisms that explain this disconnect and to identify other factors that influence participants' behavioural intentions.

3.6.2. Managerial Implications

This study provides practical insights for event organisers and app developers in the sports tourism industry to enhance participant satisfaction, event experiences, and leverage app technologies effectively.

First, to improve participant satisfaction and app usefulness, organisers and developers should prioritise features perceived as beneficial, such as route planning, obstacle information, offline real-time navigation, and constant communication with organisers and peers. Creating user-friendly interfaces, visually appealing graphics, and optimised app performance contributes to a delightful user experience, fostering positive event experiences and increasing affective commitment to the event.

Second, recognizing the significance of successful event experiences in fostering place attachment, organisers can host events in memorable destinations, incorporate scenic routes, organise engaging activities, and facilitate interactions with local communities. These efforts enhance participants' enjoyment and immersion in the experience, leading to a stronger sense of attachment to the event place and a lasting emotional connection.

Third, promoting word-of-mouth (WOM) and electronic word-of-mouth (eWOM) among participants is crucial for event promotion. Encouraging participants to share their journey and recommend the event through social media platforms, online communities, forums, and testimonials helps attract more individuals to future events. Implementing a dedicated hashtag and offering incentives for active hashtag users further boosts event promotion. User-generated content, like a gallery space within the app, enables participants to capture and share moments from the event, enhancing event visibility.

Last but not least, leveraging participants' positive experiences is key to enhancing affective commitment to the event. Tailoring participant experiences through targeted content and exclusive perks based on preferences makes participants feel valued and understood. Engaging activities and memorable experiences leave a lasting impression. Building a strong event community through connectivity and interaction facilitates bonding and increases affective commitment. Regular communication before and after the event, gathering feedback, sending thank-you emails, and

providing access to photo galleries and special aftermath gatherings nurture long-term engagement.

3.6.3. Limitations and further research

Different limitations and suggestions for future research are defined. First, the research focused on the context of sports events. The unique characteristics and dynamics of cycling events, such as the level of physical activity involved, the environment, and the specific interests of participants, may have influenced the connection between the app technology, the event experience, and the behavioural outcomes. Therefore, future studies could examine the impact of app technology on event experiences in other types of events and industries. Second, the study primarily relied on self-reported data obtained from the administrated questionnaire, therefore, social desirability bias could have affected the results (Cerri *et al*., 2019). It would be interesting to measure the impact of app technology on event experiences using additional methods such as observational data or qualitative interviews. This could provide a more comprehensive understanding of the participants' actual behaviours and experiences. Third, the study focused on the relationship between app technology constructs and event experiences. Additional external variables such as individual characteristics (e.g., age, gender, cycling experience), event-specific factors (e.g., event size, location, weather conditions), and social influences (e.g., group dynamics, peer interactions) could be considered for future research to explore the rest of the dynamics that shape participants' event experiences. In conclusion, while this study contributes to the app technology and event experience literature with valuable insights in the context of cycling events, some limitations should be acknowledged. Future research should address these limitations by considering different event contexts, employing diverse data collection methods, and investigating additional influencing factors to further enhance the understanding of the complex dynamics at play.

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Chapter 4:

4. Gameplay to game pitfall: Unravelling problematic behaviours in Esports driven by gameful experience, psychological ownership, and seeking excellence

Chapter 4 represents the third study of this doctoral dissertation. This paper intends to investigate how experiences within esports contribute to the development of problematic behaviours. More precisely, it aims to analyse the connections among gameful experiences, seeking excellence, the development of habits, tendencies towards addictive usage, and the lack of self-regulation.

4.1. Abstract

Purpose*:* This study aims to examine the influence of the esports experience on driving problematic behaviours. Specifically, it seeks to explore the relationship between gameful experience, seeking excellence, habit formation, addictive use, and self-regulation deficiency.

Methodology*:* Data collection was conducted through a survey distributed via a panel, with a total sample size of 400 participants who are actively engaged in playing FIFA in the Spanish market.

Findings*:* The findings of the study revealed significant associations between gameful experience and seeking excellence, as well as between gameful experience and psychological ownership. Seeking excellence was found to have an impact on habit formation, addictive use, and self-regulation deficiency. Moreover, psychological ownership was linked to seeking excellence and self-regulation deficiency. Contrary to expectations, habit formation did not directly lead to addictive use; however, self-regulation deficiency emerged as a significant predictor of addictive use among esports players.

Originality*:* This study contributes to the existing literature by adopting a dual-system theory approach to understanding the mechanisms underlying problematic behaviours in esports, specifically focusing on the role of gameful experience. The findings shed light on the complex interplay between psychological factors such as seeking excellence, habit formation, and self-regulation deficiency, providing valuable insights for researchers, practitioners, and policymakers in addressing addictive behaviours in gaming contexts.

Keywords: Addictive use, dual-system theory, esports, gameful experience, habit, psychological ownership, seeking excellence, self-regulation deficiency.

4.2. Introduction

In recent years, esports have transformed from a niche activity into a global phenomenon, capturing the attention of millions of participants. With its origins tracing back to the early days of video gaming, esports have evolved into a highly organised, competitive, and lucrative industry. Accordingly, the esports audience has grown to an estimated 531.9 million globally, with revenues exceeding 1.10 billion dollars in 2022 and projected to reach 4.30 billion dollars in 2024, indicating a significant surge in commercial interest (Statista, 2023).

The exponential growth of esports highlights the importance of understanding its psychological impacts, particularly as they relate to players' behaviours and well-being. In line with this, the field of esports has attracted substantial academic interest (Jeong and Youk, 2023), specifically regarding spectatorship, its consumption, the psychological aspects of gaming, and their consequences (Bányai *et al*., 2019; Hamari and Sjöblom, 2017; Hollebeek *et al*., 2022). Additionally, there has been a growing body of literature exploring the mental and physical health implications of esports participation (Kelly and Leung, 2021; Macey and Hamari, 2019). However, and despite this growth in research, there remain gaps in understanding the unique experiential aspects of esports and their impact on the physical and psychological well-being of the players (Abbasi *et al.*, 2023). Ramella-Zampa *et al*. (2022) have identified that forthcoming studies should examine the primary risk factors associated with addictive behaviours and should focus on providing guidelines promoting awareness on how to prevent this.

This study addresses these identified gaps by introducing a novel research model aimed at examining the pathways through which esports experiences contribute to excessive behaviours. Specifically, the model delves into the impact of the gameful experience, characterised by the immersive, interactive, and engaging gameplay (Habachi *et al.*, 2024), from a dual-system theory (Kahneman, 2011). By leveraging this theoretical lens, this research aims to discern the distant consequences of the cognitive and affective processes, delineated as System 1 and 2, respectively. This approach will uncover the underlying drivers of esports behavioural outcomes, distinguishing between the fast, automatic responses (System 1) and the slow, deliberate one (System 2). To achieve this, on one hand, this paper aims to shed the light on the differential effects of the gameful experience, namely seeking excellence

(SE) and psychological ownership (PO). In this context, PO involves the sense of possession and attachment players develop towards their in-game assets and achievements (Pierce *et al.*, 2003), while SE reflects the intrinsic motivation and the desire for skill mastery (Ryan *et al*., 2006). And on the other hand, it seeks to uncover the consequences of these outcomes, particularly habit formation (Graybiel, 2008), self-regulation deficiency (Baumeister *et al*., 2006), and addictive use (Markey and Markey, 2010).

The study contributes to the existing literature by, first, shifting the focus towards the experiential dimensions of esports, highlighting its role as a catalyst for various triggers that result into negative behavioural outcomes. Second, by introducing novel constructs to the dual-system framework and validating their relevance within the esports context. This research will expand the understanding of the complex interplay between the cognitive and affective processes underlying problematic behaviours. Third, this study will provide actionable insights contributing to the development of more responsible gaming environments while underscoring the importance of considering gameful factors in the design and the implementation of interventions aimed at promoting healthier gaming habits.

4.3. Literature review and research hypotheses

4.3.1. Theoretical framework: The dual-system theory

The dual-system theory posits the existence of two distinct but interacting systems of cognitive processes within the human mind. System 1 (reflexive) is characterised as fast, automatic, intuitive, and often subconscious, while System 2 (reflective) is slower, more deliberate, analytical, and conscious (Frankish, 2010). System 1 operates effortlessly and is responsible for quick judgments and routine operations, often relying on heuristics. In contrast, System 2 requires conscious effort and is engaged in complex problem-solving tasks, logical reasoning, and when a situation is new or challenging (Evans and Stanovich, 2013). Additionally, the interaction between these two systems is explained by System 2 modifying System 1's responses through decision-induced associative cluster activation and behavioural direction, while System 1 influences System 2 by altering associative cluster accessibility, which impacts judgment and decision processes (Deutsch and Strack, 2006).

In esports, the dual-system theory provides insightful perspectives on players' behaviours to study cognitive and behavioural dynamics, especially in relation to players' engagement and potential problematic behaviours (Hamari and Keronen, 2017). In this sense, this research applies the dual-system theory to examine how the gameful experience initiates cognitive processes leading to distinct behavioural pathways. On one hand, the gameful experience moves the players towards SE through its impact on intrinsic motivations and performance (Mekler *et al*., 2017), subsequently evolving into habitual behaviours. This transition from striving for success to forming habits underscores how engaging game dynamics can foster automatic responses, potentially culminating in excessive gaming (Billieux *et al.*, 2015; Wood and Neal, 2009). According to previous research, SE is primarily associated with System 2. This association is due to the deliberate and conscious effort required to set high personal standards, engage in challenging tasks, and persist in the face of obstacles (Lieberman *et al.*, 2004). However, as individuals engage in activities to pursuit excellence, certain aspects of these activities can become habitual, and thus fall under the domain of System 1. In this sense, System 1 processes information using cognitive and emotional connections, prompting quick behavioural reactions. These behaviours become automatic and get activated upon encountering specific cues (Soror *et al.*, 2015). In alignment with this, habit is often understood as learned sequences of behaviours that become automatic responses to specific situations (Li and Suh, 2021). Therefore, it is considered as an outcome of System 1. These instances demonstrate how repeated practice and mastery can transition certain elements of SE from System 2's deliberate control to System 1's automatic processing (Logan, 1988).

On the other hand, System 2's activation through the gameful experience leads to PO, where players develop a deep sense of attachment and identity with their teams (Pierce *et al.*, 2003). This emotional investment can often result in self-regulation deficiencies, manifesting as an inability to control gaming habits, which may lead to problematic behaviours (Turel and Serenko, 2012). System 2 operates reflectively and requires deliberate cognitive processing. This system is tasked with establishing highly ambitious objectives, pursuing their accomplishment, and overseeing their progress (Baumeister *et al.*, 2006), which aligns with the characteristics of PO (Pierce *et al.*, 2003). PO is marked by the individuals' awareness, thoughts, and beliefs regarding

the target of ownership (Avey *et al*., 2009; Boyer, 2023). Its deliberate nature is underscored by its cognitive components, which include feeling more accountable for what happens to the target, experiencing a sense of attachment, and a feeling of personal identification (Avey *et al*., 2009). This connection enhances the individuals' engagement and dedication to the target, a process requiring significant cognitive resources that are characteristic of System 2. However, this heightened PO can lead to a deficiency in self-regulation. For instance, in feeling responsible for your team in the game and wanting to make them the best, players will deliberately start spending more time in the game and developing the adequate strategies and set of skills to achieve this objective. This deliberate management of one's cognitive, emotional, and behavioural response to achieve specific goals is what characterises self-regulation (Soror *et al.*, 2015).

4.3.2. Esports and problematic behaviours

The emergence of esports as a prominent form of digital entertainment has brought with it a growing concern regarding problematic behaviours associated with intensive gaming, including gaming addiction, excessive play, and impaired social functioning (King and Delfabbro, 2018). These behaviours often manifest as a compulsive need to engage in gaming, its prioritisation over other life activities, and difficulties in managing the play time effectively (Neut *et al*., 2023; Stevens *et al*., 2020). This section aims to explore these problematic behaviours in esports, drawing on current research to understand their prevalence, underlying causes, and potential impacts on the individuals.

4.3.2.1. Addictive use

Rooted in the behavioural addiction framework, this concept conceptualises certain non-substance-related behaviours, including excessive gaming, as potentially addictive due to their similar effects and consequences to substance-related ones (Griffiths, 2005).

Addictive use (ADD) in gaming is typically marked by several key features. The most prominent among these is the loss of control over gaming habits, where individuals find it challenging to regulate their gaming time and activities (Pontes *et al*., 2019). Additionally, there is a preoccupation with gaming, where a significant amount of time is spent thinking about, planning, and engaging in gaming activities (Luo *et al*., 2022).

Another critical aspect is the continuation or escalation of gaming despite the awareness of negative repercussions, such as deteriorating personal relationships, declining academic or professional performance, and adverse health impacts (King and Delfabbro, 2018). Furthermore, withdrawal symptoms, such as irritability, anxiety, or sadness, when unable to play, and tolerance, where increasingly more time is needed to be spent gaming to achieve the same level of satisfaction, are also indicative of addictive use (Wichstrøm *et al*., 2018). These features underscore the complex and multifaceted nature of gaming addiction, highlighting its potential impact on psychological well-being, daily functioning and addictive behaviours.

4.3.2.2. Formation of gaming habit

The concept of habit formation (HAB) in esports is a critical area of study, delving into how repetitive gaming behaviours evolve into automatic and often unconscious patterns. This notion is deeply rooted in the field of behavioural psychology, where a habit is defined as an automatic response that develops through the consistent and repeated performance of a behaviour in a stable context (Graybiel, 2008).

The significance of habit formation in esports lies in its dual impact. On one side, these automatic behaviours can be advantageous, enhancing gaming proficiency, reducing reaction times, and aiding in strategic decision-making, which are essential aspects of competitive gaming (Huang *et al.*, 2017). However, on the flip side, these habitual behaviours can become problematic, particularly when they lead to compulsive gaming practices (Kuss and Griffiths, 2012). The progression from habit to addictive often occurs when the habituated action is inherently rewarding or pleasurable. In this sense, behaviours that offer immediate gratification or relief reinforce the action, increasing its frequency and intensity (Lewis *et al.*, 2016).

Prior research acknowledged the significant influence of habit formation on driving addictive use. Research showed that habit can be a key driver for technology addiction, as it generates positive reinforcement that contributes to the formation of adverse outcomes related to technology-related addictions (Chen *et al.*, 2019; Mylonopoulos and Theoharakis, 2021; Turel and Serenko, 2012). Furthermore, gaming habits have been associated with symptoms of video game addiction, highlighting the influence of habit formation on addictive gaming behaviour (Mora-Salgueiro *et al.*, 2022). Therefore, habit formation is expected to significantly contribute to gaming addictive use in the esports context as well.

H1. Gaming habit formation positively and significantly leads to addictive use.

4.3.2.3. Self-regulation deficiency

Self-regulation deficiency (SRD), grounded in the broader framework of self-regulation theory (Baumeister *et al.*, 2006), refers to the challenges individuals face in managing and controlling their behaviours to align with personal goals and societal expectations.

The competitive nature of esports can exacerbate these self-regulation challenges as the pressure to succeed and achieve can overwhelm players' ability to maintain control over their gaming habits, leading to an excess in their playtime. Additionally, the online environment of esports often provides immediate gratification and feedback, which can further impede self-regulation (Chen *et al*., 2019). This instant reward system can lead to a cycle where short-term gratification is prioritised over long-term goals and responsibilities; a phenomenon described as a central aspect of self-regulation failure (Muraven and Baumeister, 2000).

Previous literature emphasised the role of self-regulation deficiency in driving addictive use. Studies have shown that dysfunctional self-regulation plays a crucial role in maintaining internet addiction (Błachnio and Przepiorka, 2015). Furthermore, impaired self-control has been identified as a crucial factor contributing to addiction, including online game one (Kim *et al.*, 2007). Research has shown a significant negative correlation between self-regulation and addictive-like behaviours, such as online gaming, suggesting that individuals with low self-control tend to exhibit elevated addictive-like gaming behaviour (Ting and Essau, 2021). Moreover, self-control has been included as one of the protective factors of game addiction, highlighting its significance in preventing addictive gaming behaviour (Chang and Kim, 2019). Therefore, based on past evidence, it is proposed that:

H2. Self-regulation deficiency positively and significantly leads to addictive use.

4.3.3. Antecedents of problematic behaviours

4.3.3.1. Seeking excellence

Seeking excellence (SE) represents an individual's intrinsic motivation to achieve high standards of performance and mastery in a specific domain (Xun *et al*., 2023). Rooted in the self-determination theory (Ryan and Deci, 2000), SE involves the pursuit of personal growth, competence, and the fulfilment of one's potential.

In the esports, SE embodies the players' aspiration for mastery that drives them to excel in competitive gaming. Players motivated by this aspect engage in deliberate practice, invest substantial time and effort in honing their skills, and exhibit a persistent desire to achieve higher levels of competency and success within the gaming arena (Moors and Houwer, 2006). This pursuit often aligns with the growth mindset (Dweck, 2006), where players believe their gaming abilities can be developed through dedication and hard work, leading them to embrace challenges and learn from failures.

4.3.3.1.1. Seeking excellence and addictive use

The pursuit of excellence, while intrinsically motivating and often beneficial for personal growth, can paradoxically lead to addictive use, particularly in domains where high achievement is highly valued, such as in esports (Chung *et al.*, 2019). This is aligned with the idea that the relentless pursuit of mastery and perfection, as part of SE, can sometimes blur the lines between healthy ambition and excessive, compulsive behaviours (Xu *et al.*, 2012).

Previous studies have found that SE can lead to addictive use through various psychological and behavioural factors. For instance, through perfectionism, the relationship between this construct and addictive behaviours has been explored in various contexts, such as gambling, exercise addiction, and technology addiction (Ayadi *et al.*, 2021; Çakın *et al.*, 2021; Feizollahi *et al.*, 2022). Studies have shown that all forms of perfectionism are associated with internet addiction symptoms, and maladaptive perfectionism has been directly related to students' internet addiction (Maftei and Opariuc-Dan, 2023; Yang *et al.*, 2021). Additionally, the influence of technology affordance on addictive use in massively multiplayer online games (MMOGs) has been demonstrated, indicating that virtual-domain perfectionism influences addictive use positively in this context (Xun *et al.*, 2023). Conversely, research has shown that SE, through sensation seeking characterised by the desire for novel and intense experiences, is linked to positive associations with online games, which in turn is linked to online gaming addiction (Hu *et al.*, 2017; Mehroof and Griffiths, 2009). Drawing on the above, it is expected that:

H3. Seeking excellence positively and significantly leads to addictive use.

4.3.3.1.2. Seeking excellence and habit

In activities where excellence is pursued, the continuous repetition of specific actions and strategies is essential for improvement and mastery (Moors and Houwer, 2006). These repeated behaviours gradually become automated responses to contexts or cues, effectively transforming into habits (Harvey *et al.*, 2021). In the pursuit of excellence, the repeated engagement in certain activities becomes less about conscious choice and more about an automatic response to the contextual cues associated with the activity (Wood and Neal, 2007). For instance, in esports, players initially driven by the goal of excellence, can lead to a rigid pattern of behaviours where players find themselves engaging in the activity out of habit, rather than deliberate choice. In this sense, previous research has shown that the pursuit of perfection can lead to repetitive gaming behaviours, contributing to habit formation (Xun *et al.*, 2023). Moreover, the influence of virtual-domain perfectionism on addictive use in MMOGs has been highlighted, suggesting that perfectionist tendencies may contribute to the formation of habitual behaviours (Liu *et al.*, 2018). Therefore, it is expected that:

H4. Seeking excellence positively and significantly leads to gaming habit formation.

4.3.3.1.3. Seeking excellence and self-regulation deficiency

When individuals intensely focus on achieving excellence, they often set remarkably high standards and engage in rigorous, goal-oriented activities. While this pursuit highlights a commendable commitment to personal growth, it can also lead to an overextension of mental and emotional resources, which are key components of self-regulation (Baumeister *et al.*, 2006). In the process of seeking excellence, individuals may become so absorbed in their pursuit that they neglect other important aspects of well-being and life balance. Consequently, this single-minded focus can deplete their self-regulatory resources (Baumeister and Vohs, 2007).

Scholars have previously proven that the pursuit of gaming excellence may inadvertently lead to self-regulation deficiency due to the potential impact of ego depletion, self-stigma, and sensation seeking on gaming behaviour (Baumeister and Vohs, 2007; Fang and Zhao, 2009). Ego depletion can hinder individuals' ability to effectively regulate their gaming habits, potentially leading to excessive and uncontrolled gaming behaviour (Baumeister and Vohs, 2007; Baumeister *et al.*, 2006). Additionally, the presence of self-stigma related to gaming may deter individuals from seeking help or acknowledging problematic gaming behaviours, thereby impeding

effective self-regulation in gaming contexts (Li and Whelan, 2023). Furthermore, sensation seeking may contribute to heightened engagement in gaming, potentially leading to difficulties in self-regulation and impulse control (Fang and Zhao, 2009). Therefore, it is suggested that:

H5. Seeking excellence positively and significantly leads to self-regulation deficiency.

4.3.3.2. Psychological ownership

Psychological ownership (PO) refers to the feelings of possessiveness and personal attachment that individuals develop towards a target, which may not necessarily involve legal ownership and rather a feeling that the target of ownership or a piece of it is "theirs" (Pierce *et al.,* 2003). PO arises from three primary routes: control over the target, intimate knowledge of it, and investment of the self into the target (Baxter *et al.*, 2015). The sense of control provides individuals with a feeling of efficacy and autonomy. Intimate knowledge of the target allows individuals to perceive it as an extension of themselves, while investment of the self involves the contribution of personal time, effort, or ideas, leading to a sense of responsibility and attachment towards the target (Edwards *et al.*, 2023). In the context of esports, the players would develop a deep sense of attachment and possessiveness towards various elements within the gaming environment reflected by control, knowledge, and investment of the self in the game (Mishra and Malhotra, 2021).

4.3.3.2.1. Psychological ownership and seeking excellence

PO can enhance an individual's intrinsic motivation to achieve ambitious standards and mastery. When individuals feel a strong sense of ownership over their areas of interest, they are more likely to invest effort, show persistence, and strive for higher levels of achievement. This is because the targets of ownership become extensions of the self; thus, their improvement and success will reflect directly on the individual’s identity and self-esteem (Dyne and Pierce, 2004).

This sense of ownership can lead individuals to seek perfectionism through various psychological mechanisms. Flett *et al.* (2002) highlighted that personal capability and success in achievement situations can influence individuals to increase their personal goals, leading to a tendency towards self-oriented perfectionism. This indicates that a sense of ownership over one's capabilities can drive individuals to set higher standards for themselves, contributing to the pursuit of excellence. Additionally, Hill *et al.* (2008)

emphasised that the desire to validate a sense of self-worth may compel individuals high in socially prescribed perfectionism to engage in intense achievement striving. This suggests that a sense of ownership over one's self-worth and identity can lead individuals to seek perfectionism as they strive for external validation and recognition. Moreover, Stoeber (2015) found that other-oriented perfectionism is associated with seeking admiration from others and a greater sense of entitlement, indicating that a sense of ownership over one's social image and interactions can drive individuals to pursue perfectionism as they seek external approval and validation. Therefore, in the context of esports, we posit that individuals with a sense of ownership over their teams will significantly seek excellence in the game. The suggested hypothesis is as follows:

H6. Psychological ownership positively and significantly impacts seeking excellence.

4.3.3.2.2. Psychological ownership and self-regulation deficiency

PO can lead to self-regulation deficiency through its influence on individuals' sense of control, self-efficacy, and self-identity (Avey *et al.*, 2009; Dyne and Pierce, 2004; Pierce *et al.*, 2003). PO satisfies basic human needs such as having a sense of place, efficacy, and self-identity (Dyne and Pierce, 2004). This sense of control and self-efficacy can lead individuals to feel responsible for achieving success, which can result in a self-regulation deficiency if they are unable to meet their own expectations (Avey *et al.*, 2009). In the context of gaming, where users cannot physically possess virtual items, PO becomes particularly important as it affects users' perceptions of control and belongingness within the game environment (Li and Joo, 2023). Therefore, their sense of ownership towards the in-game elements increase, leading these individuals to spend more time gaming. As a result, they start exhibiting poorer emotion regulation (Caro and Popovac, 2020). In line with this, PO is contributing to the players' self-regulation deficiency. Therefore, the following hypothesis is suggested:

H7. Psychological ownership positively and significantly contributes to the players' self-regulation deficiency.

4.3.3.3. Gameful experience

The gameful experience (GAMEX), which includes a spectrum of positive emotional responses and engaging qualities, is a direct result of using a system infused with elements of gamification (Eppmann *et al.*, 2018; Habachi *et al.*, 2023). The range of emotions covered by this concept extends to feelings of joy, pleasure, and fun,

alongside an emphasis on the involvement aspects that are typical in game play (Mishra and Malhotra, 2021).

In esports, the gameful experience is characterised by the deep psychological engagement and emotional responses evoked by the competitive and immersive nature of these digital games. Esports, blending the interactive elements of gaming with the intensity of competitive sports inherently cultivates a gameful experience that goes beyond mere recreation (Kawabe *et al.*, 2022).

4.3.3.3.1. Gameful experience and psychological ownership

The ability to control one's environment, make choices, and witness the consequences of these choices in a gameful setting reinforces the feeling that one has a stake in the game, further intensifying the sense of ownership. Mishra and Malhotra (2021) highlighted the significance of understanding how the gameful experience impacts the PO towards the game and the players' attitude towards in-game advertising. This suggests that PO plays a crucial role in shaping players' attitudes and behaviours within the gaming environment. Furthermore, Shahzad and Salo (2023) demonstrated significant effects of factors such as control in gaming and positive emotions on PO, indicating that consumers who perceive greater control in gaming, reflected by the dominance dimension of the gameful experience scale, are more likely to develop a sense of ownership over their games. Hence, the proposed hypothesis is as follows:

H8. The gameful experience positively and significantly impacts psychological ownership.

4.3.3.3.2. Gameful experience and seeking excellence

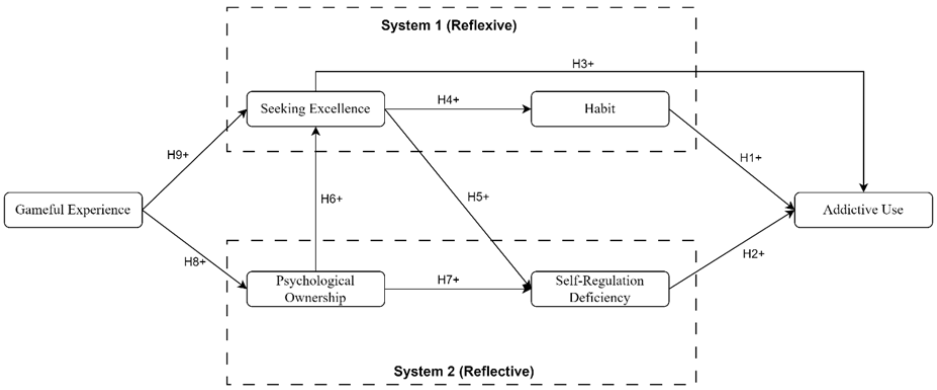
The gameful experience fosters a motivational climate that encourages individuals to strive for excellence. Intrinsic motivation, which is at the heart of the gameful experience, is essential for the pursuit of excellence (Mekler *et al.*, 2017). When individuals are intrinsically motivated, they engage in activities for the sheer pleasure and satisfaction derived from the task itself, rather than for external rewards. Furthermore, the gameful experience enhances learning and skill development, both of which are key components in the pursuit of excellence (Riivari *et al.*, 2021). When individuals find an activity enjoyable and stimulating, as is often the case in gameful environments (Eppmann *et al.*, 2018), they are more likely to devote time and energy to it, persisting even in the face of difficulties.

Previous literature has found that the use of game dynamics and motives for play, such as curiosity, thrill-seeking, and social motives, has been associated with players' behaviours and their pursuit of excellence within the game context (Constant and Levieux, 2022). Moreover, the sensation seeking has been linked to higher entertainment value, suggesting that individuals with high sensation seeking tendencies find games more entertaining, which may drive them to seek excellence within the gaming environment (Hu *et al.*, 2017). In this sense, it is anticipated that the gameful experience will similarly foster the pursuit of excellence within the esports environment. Consequently, we posit that:

H9. The gameful experience positively and significantly impacts seeking excellence.

The hypotheses proposed above are showed in the conceptual model (see Figure 4.1).

Figure 4.1. Research model



4.4. Methodology

4.4.1. Research context

The research context of this study is the FIFA esports game. As of recent years, the FIFA video game series, developed by EA Sports, have seen remarkable growth, both in terms of players' base and viewership. The FIFA eWorld Cup 2019, for instance, witnessed a record-breaking 47 million viewers, a staggering 60% increase from the previous year, highlighting the game's widespread appeal (Inside FIFA, 2019). This popularity is indicative of the game's significant impact within the esports landscape.

In FIFA esports, players engage in virtual football matches, simulating real-world football game play with a high degree of realism. This involves managing teams, strategising play formations, and actively participating in matches. The game replicates real-life football, including players' movements, team dynamics, and even the atmosphere of world-class stadiums, providing an authentic experience to gamers and football fans alike. The competitive nature of FIFA esports, where players and teams compete in leagues and tournaments, adds an additional layer of engagement and excitement. Players often exhibit a strong sense of attachment, personal investment and PO in their virtual teams and achievements within the game.

4.4.2. Procedure

Data collection was conducted in January 2024 through an online survey utilising the services of Netquest, a renowned online panel provider with a strong presence in the Spanish market. The selection criteria for the final 400 participants included individuals who actively play FIFA within the Spanish market, ensuring that the sample was directly relevant to the research objectives. The survey included a series of structured questions formulated to gather insights into the gameful experience, PO, and other relevant psychological constructs within the context of esports, according to the research model. While conducting the survey, ethical considerations were applied. This included obtaining informed consent from all participants, ensuring the confidentiality and anonymity of their responses, and adhering to the data protection laws and guidelines prevalent in the Spanish market. The gender distribution of the sample was 39.8% female and 60.2% male. Regarding age, most respondents were between 36 and 55 years old.

4.4.3. Questionnaire design and measurement

This study used a seven-point Likert scale (1=strongly disagree; 7=strongly agree) with items validated in previous studies. The survey was organised into several sections, each targeting different elements of the research framework. The initial section gathered sociodemographic information and details about the participants' experience with playing FIFA. The subsequent section included items to measure the gameful experience scale (Eppmann *et al.,* 2018) tailored to the esports FIFA environment. GAMEX was defined as a second-order mode B construct consisting of six first-order constructs: Enjoyment (ENJ), Creative Thinking (CT), Dominance (DOM), Absence of Negative Affect (ANA), Activation (ACT), and Absorption (ABS).

The third section concentrated on the players' PO of their in-game teams and seeking excellence. A scale modified from Mishra and Malhotra (2021) was used to measure PO and the drive for excellence was gauged using items modified from Xun *et al.* (2023). The fourth section dealt with gaming habits and self-regulation, with the latter being reverse scored for clearer interpretation. The construct of HAB was measured using a scale from Bhattacherjee *et al.* (2012), and SRD was evaluated using a reverse-scored scale from Haagsma *et al.* (2013). The last section of the survey addressed addictive gaming behaviour as a behavioural outcome, employing a modified scale from Xun *et al.* (2023) to assess the degree of addictive gaming behaviours among the participants. A copy of the questionnaire is provided in the appendix (Appendix C).

4.5. Results

4.5.1. Measurement model assessment

Partial least squares structural equation modeling (PLS-SEM) was used to evaluate the hypotheses, with the SmartPLS 4.0 software. To estimate the multidimensional GAMEX construct, the two-stages approach was employed. During the initial phase, all first-order latent variables were assessed reflectively (Mode A). Within this phase, one indicator from the ACT dimension was excluded due to insufficient individual reliability. In the second stage, and after obtaining the latent variable scores for the first-order constructs, the second-order final measurement model was analysed. Table 4.1 shows the results of the second-stage estimation for the reflective constructs. These constructs demonstrated internal consistency, with both individual and composite reliability estimates exceeding the threshold of 0.70 (Hair *et al.*, 2022). Additionally, the average variance extracted (AVE) values for the constructs exceeded the critical threshold of 0.50, thereby confirming convergent validity (Hair *et al.*, 2019) (Table 4.1). The Heterotrait-Monotrait (HTMT) ratios of the second-order model were all below 0.85 (Henseler *et al.*, 2015), therefore confirming the existence of discriminant validity among the constructs (Table 4.2).

Table 4.1. Reflective measurement model – Stage II

Construct	Items	Outer loadings	Composite Reliability	AVE
SE	SE1	0.820	0.920	0.696
	SE2	0.889		
	SE3	0.837		
	SE4	0.777		
	SE5	0.844		
PO	PO1	0.916	0.950	0.826
	PO2	0.909		
	PO3	0.921		
	PO4	0.889		
HAB	HAB1	0.870	0.903	0.756
	HAB2	0.864		
	HAB3	0.875		
SRD	SR1	0.780	0.877	0.506
	SR2	0.685		
	SR3	0.634		
	SR4	0.692		
	SR5	0.762		
	SR6	0.611		
	SR7	0.792		
ADD	ADD1	0.874	0.961	0.753
	ADD2	0.875		
	ADD3	0.908		
	ADD4	0.868		
	ADD5	0.852		
	ADD6	0.849		
	ADD7	0.869		
	ADD8	0.843		

Note: Addictive use (ADD), habit (HAB), psychological ownership (PO), seeking excellence (SE), self-regulation deficiency (SRD).
Source: Created by authors.

Table 4.2. Discriminant validity analysis – Stage II

	1	2	3	4	5
1. ADD	**0.868**	0.402	0.433	0.455	0.697
2. HAB	0.360	**0.870**	0.615	0.630	0.342
3. PO	0.408	0.544	**0.909**	0.699	0.351
4. SE	0.426	0.544	0.639	**0.834**	0.370
5. SRD	0.672	0.304	0.347	0.354	**0.711**

Note: Bold values in the diagonal represent the root square of the AVE values; Values below the diagonal indicate constructs' correlations; Values above the diagonal are the HTMT ratios.
Source: Created by authors.

For the Mode B multidimensional construct, the VIFs ranged between 1.239 and 2.156 (Table 4.3), suggesting an absence of multicollinearity (Hair *et al.*, 2017). Furthermore, an assessment of external validity was conducted by assessing the indicators' statistical weights. In the present study, all dimensions encompassing the gameful experience construct displayed significant weight, except for ANA. Its outer loading was subjected to examination and was found to exhibit a value of 0.390 (Table 4.3). Subsequently, the significance of ANA's outer loading was rigorously assessed through a complementary bootstrapping analysis comprising 8,000 subsamples, confirming its statistical significance ($p < 0.001$). Therefore, this dimension was retained to preserve content validity (Hair *et al.*, 2017).

Table 4.3. Formative measurement model – Stage II

Construct	Dimensions	Outer weights	Outer loadings	VIF
Gameful Experience (GAMEX)	Absorption	0.135*	0.658**	1.624
	Activation	0.240*	0.747**	1.922
	Absence of negative affect	-0.090	-0.132	1.239
	Creative Thinking	0.236*	0.789**	1.884
	Dominance	0.464**	0.903**	2.156
	Enjoyment	0.179*	0.641**	1.779

Note: VIF = Variance inflation factor; *p<0.05, **p<0.01
Source: Created by authors.

4.5.2. Structural model assessment

Contrary to our initial expectations, the results showed that HAB had a positive but insignificant impact on ADD (β = 0.090, t = 1.869), leading to the rejection of H1. However, the hypothesis H2, which proposed a significant relationship between SRD and ADD, found strong empirical support (β = 0.584, t = 18.019). Similarly, H3, examining the impact of SE on ADD, was supported (β = 0.170, t = 3.527), indicating a significant positive effect. Further, the hypothesis H4, which explored the influence of SE on HAB, was also supported (β = 0.544, t = 13.243), alongside H5 that linked SE to SRD (β = 0.224, t = 3.540). Additionally, H6, investigating the impact of PO on SE, received substantial support (β = 0.348, t = 6.350). H7, which posited a relationship between PO and SRD, was also supported (β = 0.204, t = 3.398), suggesting a significant influence. Moreover, H8, examining the influence of GAMEX

on PO, was strongly supported (β = 0.665, t = 20.625), as was H9 that connected GAMEX SE (β = 0.438, t = 8.779). The results of the structural model are summarised and presented in Table 4.4.

Table 4.4. Structural model results

Structural Relationship	β	t-value	p-value	Hypothesis Testing
H1. HAB → ADD	0.090	1.869	0.062	Not Supported
H2. SRD → ADD	0.584	18.019***	0.000***	Supported
H3. SE → ADD	0.170	3.527***	0.000***	Supported
H4. SE → HAB	0.544	13.243***	0.000***	Supported
H5. SE → SRD	0.224	3.540***	0.000***	Supported
H6. PO → SE	0.348	6.350***	0.000***	Supported
H7. PO → SRD	0.204	3.398**	0.001**	Supported
H8. GAMEX → PO	0.665	20.625***	0.000***	Supported
H9. GAMEX → SE	0.438	8.779***	0.000***	Supported
R^2 (PO) = 0.442; R^2 (SE) = 0.515; R^2 (SRD) = 0.150; R^2 (HAB) = 0.296; R^2 (ADD) = 0.497				

Note: Habit (HAB), addictive use (ADD), self-regulation deficiency (SRD), seeking excellence (SE), psychological ownership (PO), gameful experience (GAMEX), *p<0.01. **p<0.05. ***p <0.001. Analysis was run at 5% significance level.
Source: Created by authors.

4.6. Discussion

4.6.1. Theoretical implications

This research significantly contributes to the understanding of players' experiences and behaviours in esports. By developing a novel research model, this study investigates the relationships between addictive use and its triggers, such as habit and self-regulation deficiency. It also explores how the gameful experience, through psychological ownership and seeking excellence, leads to the formation of these triggers. The findings provide a nuanced understanding of how these factors interact and influence esports users' behaviours.

Firstly, this study extends the applicability of the dual-system theory to esports by introducing and empirically investigating novel psychological elements such as seeking excellence, psychological ownership, habit, and self-regulation deficiency. These additions enrich the understanding of how individuals engage with esports, offering insights into the interplay between the cognitive and emotional processes (Evans and Stanovich, 2013; Kahneman, 2011). Furthermore, including these

elements enhances the theory's capacity to elucidate the motivations, emotional attachments, and self-regulatory behaviours that underlie the users' interactions. Accordingly, it was found that the deliberate, analytical, and conscious thought processes (System 2) were more dominant than the quick, and subconscious reactions (System 1). This suggests a greater capacity for reflective thinking and rational decision-making, potentially leading to more thoughtful and less impulsive actions and judgments in this field. Additionally, this research validates the interactivity of the reflective and reflexive systems in esports, moving beyond their duality (Deutsch and Strack, 2006). This reveals how cognitive strategies and instinctual reactions influence performance, highlighting the importance of training both systems for optimal decision-making and reaction times in competitive gaming scenarios.

Secondly, the non-significant relationship between habit and addictive use, contrary to the prevailing literature, carries important theoretical implications. While previous research has often indicated that habitual engagement may lead to addictive behaviours (Wölfling *et al.*, 2020), our findings challenge this perspective. This result suggests that the progression from habitual esports engagement to addiction may not be a straightforward linear process, emphasising the complexity of esports consumption patterns. This calls for a re-evaluation of the unique determinants that contribute to addictive use in the esports context, beyond the sole influence of habit. Thirdly, this study supports that self-regulation deficiency is a significant predictor of addictive use in esports. This finding corroborates existing literature on behavioural addiction, emphasising the critical role of self-regulation in moderating compulsive usage patterns (Billieux *et al.*, 2015). The implication of this relationship suggests that enhancing self-regulatory capacities could be an effective strategy in mitigating addiction risks among esports enthusiasts.

Fourthly, this research substantiates that seeking excellence is positively correlated with both habit formation and addictive use in esports. These findings highlight the dynamics between the pursuit of high achievement, habit development, and potential addiction. It echoes Ryan and Deci's (2000) theory on motivation, suggesting that while the drive for excellence can foster skill advancement, it may also inadvertently lead to addictive behaviours. These results advocate for a more nuanced understanding of players' motivations in esports, balancing the pursuit of excellence with awareness of its potential negative repercussions. Additionally, our study reveals

that the pursuit of excellence in esports is positively associated with a deficiency in self-regulation. This finding is reminiscent of the flow concept in gaming, where intense engagement can overshadow self-control (Csikszentmihalyi, 1990). It suggests a paradox in esports engagement where striving for success could potentially undermine self-regulatory mechanisms. Fifthly, this study highlights the significant influence of psychological ownership on both the seeking excellence and self-regulation deficiency. This reinforces the role of psychological ownership in intensifying engagement and emotional investment, which can lead to both positive outcomes (like striving for excellence) and negative consequences (such as reduced self-regulation) (Pierce *et al.*, 2005). These results underline the dual nature of psychological ownership in esports, necessitating careful management to harness its benefits while mitigating its risks.

Finally, these findings underscore the crucial role of gameful experiences in fostering psychological ownership and seeking excellence among esports' players. Aligning with previous research (Habachi *et al.*, 2024; Xi and Hamari, 2020) on game design, these findings suggest that gameful elements significantly influence users' psychology and behaviours.

4.6.2. Practical implications

This research holds substantial managerial implications for esports managers and game developers. First, and despite the finding that habit does not significantly lead to addictive use, esports managers and game developers should not overlook the importance of habitual engagement among players. The lack of a direct link to addiction suggests that fostering regular, but balanced, play can be beneficial for sustaining long-term player engagement without necessarily increasing addiction risks. Game developers should design experiences that encourage regular participation while incorporating features that promote healthy gaming habits, such as reminders for breaks or time limits on gameplay.

Second, the support for the positive relationship between self-regulation deficiency and addictive use indicates a critical area for intervention. Esports industry stakeholders should focus on developing tools and features within games that assist players in managing their playtime and gaming behaviours. This could include self-regulation features, like customisable limits on gaming sessions, or educational content within the game that raises awareness about the risks of excessive play.

Third, given that seeking excellence is linked to both habit formation and addictive use, it is essential for esports designers to balance the encouragement of excellence with the responsibility of promoting healthy gaming practices. Competitive features, such as leaderboards and skill-based matchmaking, should be designed to motivate players positively without encouraging excessive play. Programs that educate players on balancing competitive gaming with other life aspects can also be beneficial.

Fourth, the positive relationship between seeking excellence and self-regulation deficiency suggests a need for esports platforms to incorporate features that help players maintain control over their gaming behaviours. This could include in-game tools for goal setting and progress tracking that encourage players to achieve excellence in a structured and controlled manner, thereby reducing the likelihood of self-regulation deficiencies.

Fifth, the findings regarding psychological ownership's impact on excellence and self-regulation highlight the importance of creating a sense of ownership in a balanced and responsible way. Game developers should focus on creating deeper, more meaningful connections between players and their in-game achievements, such as through personalised content or rewards that reflect individual progress and efforts.

Finally, the support for the positive influence of gameful experience on psychological ownership and seeking excellence underscores the importance of designing engaging and immersive gaming experiences. However, these should be balanced with mechanisms that prevent over-engagement. Features like diverse game modes, varying difficulty levels, and regular content updates can keep the gaming experience fresh and engaging without leading to excessive play.

4.6.3. Limitations and future research

This study is not exempt from limitations, which also serve as avenues for future research. Firstly, the model proposed in this study was tested using FIFA as the esports environment. Future research endeavours may explore the applicability of the new model across diverse gaming platforms or genres to ascertain the consistency of findings across varied contexts. Secondly, given the dynamic nature of problematic behaviours and gameful experiences, conducting longitudinal studies to monitor changes in gaming behaviours and their impact on players' well-being over time is warranted. Lastly, as data was collected from players in Spain, examining the model's

applicability in different countries and exploring cultural differences in the relationship between gameful experiences and problematic behaviours could offer valuable insights into the role of cultural factors in gaming habits and their effects on individual well-being.

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Chapter 5:

5. Conclusions

Chapter 5, the concluding chapter, provides the primary conclusions of the thesis. In particular, it offers an integrated discussion of the theoretical and managerial implications, limitations, and potential avenues for future research found in chapters 2, 3, and 4.

5.1. Theoretical contributions

In response to the underexplored facets of the impact of technologies on sports consumers' experiences, this research thesis aims to clarify these nuances through a marketing lens. The central objective is to delve into the different experiences that sports consumers undergo when interacting with technology and how that interaction shapes their behaviours. Within the framework of information technology, this PhD thesis is strategically focused on addressing pivotal and current gaps in marketing and consumers behaviours literature.

The outcomes of the three specific studies offer a wealth of theoretical insights, making a substantial contribution to marketing research and providing valuable guidance for scholars in the field.

Firstly, this thesis contributes to the gamification literature by examining the role of the gameful experience that sports consumers are exposed to when interacting with a branded gamified app within the context of apps for running and exercising. Furthermore, how it drives customer-brand engagement (CBE) and, in turn, brand loyalty and the intention to use the app in the future. The central finding highlights that while gameful experiences act as a crucial stimulus, their success in enhancing brand loyalty and continuous app usage critically depends on their ability to boost engagement with the brand. Therefore, this research stresses the importance of CBE and depicts the essential role of engagement in gamification strategies, suggesting that simply offering gameful experiences is insufficient; such experiences must be strategically designed to foster meaningful interactions with the brand, thereby achieving lasting impacts on loyalty and usage intentions.

Secondly, by exploring the information technology factors that influence participants' experiences during events, this thesis brings novel perspectives to the event experience literature, particularly by bridging the gap between app technologies and event experiences. The study's main finding is that app satisfaction significantly impacts participants' event experiences and affective commitment, which in turn influences their behavioural intentions, attachment to the event place, and overall event satisfaction. This underscores a positive relationship between app technology and behavioural outcomes in the context of sports tourism events.

Lastly, by addressing the timely inquiry into why sports consumers are increasingly investing their time in playing competitive video games and uncovering the underlying mechanisms, this thesis makes a noteworthy contribution to the esports literature concerned with understanding consumers' conscious and unconscious decision-making processes. Central to its findings is that habitual engagement in esports doesn't directly result in addictive behaviours; instead, self-regulation deficiency emerges as the primary predictor of addictive use. This discovery emphasises the pivotal role of self-regulatory capacities in influencing whether individuals' engagement in esports evolves into addictive behaviours. Highlighting the significance of this finding, this thesis suggests the necessity of developing and implementing strategies to enhance self-regulatory skills among esports players to help mitigate the risks of addiction.

5.1.1. Theoretical contributions in gamification and technology literature

Study 1 makes significant contributions to the gamification and technology literature through its exploration of the impacts of gameful experiences on brand loyalty and the intention to keep on using the gamified branded app in the future. Each identified theoretical implication enriches our understanding of gamification's role in consumer engagement and brand loyalty, as well as technology adoption behaviours. Below is a detailed account of how each finding enhances the relevant academic discourse:

SOR model application to gamified experiences:

By applying the Stimulus-Organism-Response (SOR) model (Mehrabian and Russell, 1974) to gamification contexts, this study broadens the theoretical applicability of the model within the technology and marketing literature. It validates the gameful experience as a pivotal external stimulus influencing brand loyalty and behavioural intentions as a response, mediated by customer-brand engagement (CBE), as an organism. This contribution not only reaffirms the model's versatility but also emphasises the importance of gamification as a strategic marketing tool in creating engaging consumer experiences (Hamari 2019, Hsu, 2023).

Redefining the relationship between gamification and brand loyalty:

The finding that the direct impact of gameful experience on brand loyalty is non-significant challenges prevailing assumptions and stimulates a re-evaluation of how gamified interactions contribute to loyalty formation (Al-Zyoud, 2021; Li and Fang,

2020). This suggests the need for a more nuanced understanding of gamification's role, indicating that additional elements beyond enjoyable interaction may be required to foster deeper brand loyalty in sports and fitness apps.

Significance of the App Activation (APPACT) dimension:

Highlighting the App Activation (APPACT) dimension's direct influence on brand loyalty introduces the concept of co-creative experiences in gamification research (Huotari and Hamari, 2017). It underscores the value of providing users with personalised, engaging experiences that allow for active participation and goal setting within the app, thereby fostering a stronger emotional connection and loyalty to the brand. This insight enriches the gamification literature by emphasising the importance of interactive and personalised gamified features (Fang, 2019; Adhikari and Panda, 2019).

Emotional dimensions as predictors of behavioural intentions:

The study's identification of enjoyment (ENJ) and absence of negative affect (ANA) as direct predictors of users' continuance intentions contributes to our understanding of emotional factors in technology acceptance and usage. By showing how positive and negative emotional responses to gamified apps influence users' engagement and adoption decisions, this research adds depth to the technology literature, highlighting the critical role of user experience design in promoting app usage, emphasising that emotions are not just peripheral but central to how users interact with and continue to use technology (Faqih, 2022; Hsieh *et al*., 2021, Robinson *et al*., 2023).

Customer-brand engagement as a mediator between gameful experience and behaviours:

By demonstrating CBE's mediating role in the relationship between gameful experience and brand loyalty/app usage intentions, the study contributes to a more comprehensive understanding of how gamification fosters brand relationships. These finding underlines that the direct effects of gameful experiences don't straightforwardly translate into increased brand loyalty. Instead, transforming these experiences into loyalty and sustained app usage depends on how effectively they enhance engagement. This nuanced understanding points to the essential role of engagement as a bridge between the enjoyment or satisfaction derived from gameful experiences

and the concrete loyalty behaviours and usage intentions critical for brands' success (Abou-Shouk and Soliman, 2021; Bitrián *et al*., 2021).

Exploring the role of self-image congruity:

The study's exploration of self-image congruity (SIC) as a moderator in gamified contexts offers new perspectives on personal identity's influence on gamification outcomes. By revealing that high SIC may weaken engagement with gamified apps in certain contexts, this research prompts a reassessment of how gamification strategies should be tailored to align with users' self-concepts, providing a nuanced understanding of user engagement strategies in the gamification and branding literature (Chen and Pu, 2014).

Collectively, these contributions not only deepen the theoretical foundations of gamification and technology research but also offer practical insights for designing more effective gamified applications that enhance user engagement and loyalty.

5.1.2. Theoretical contributions towards sports tourism and technology literature

Study 2 advances the sports tourism and technology literature by exploring the roles of mobile app technologies in enhancing sports tourism event experiences and influencing attendees' behaviours. This study aims to fill a research gap by addressing the underexplored link between mobile app satisfaction and its direct effects on sports event experiences and attendees' behaviours. While previous research has predominantly focused on the general utilisation and functionality of mobile technologies in tourism settings, there has been limited examination of how specific app features and user satisfaction directly influence the quality of event experiences and subsequent attendees' behaviours in the context of sports tourism. This study fills this theoretical gap by methodically examining these relationships, providing empirical evidence that app satisfaction is a crucial determinant of attendees' engagement and overall event success. The findings offer several theoretical implications by highlighting how well-designed app features enhance immediate user satisfaction and have longer-term impacts on attendees' engagement, loyalty, and positive word-of-mouth. Consequently, it extends the theoretical frameworks within both sports' tourism and technology acceptance literature in multiple ways:

Reevaluating the role of perceived ease of use:

Contrary to established perspectives in technology literature that prioritise perceived ease of use as a determinant of app satisfaction (Chen *et al*., 2022; Rezvani *et al*., 2022), this study reveals that perceived ease of use alone may not suffice for ensuring participant satisfaction within sports event contexts. This insight challenges the foundational assumptions of the Technology Acceptance Model (TAM) (Davis, 1989) and related frameworks, which traditionally emphasise perceived ease of use as a primary factor influencing technology adoption and satisfaction. The study suggests that a broader evaluation of app features - including functionality, performance, design, and content quality - may have equal or greater importance in specific contexts, such as sports events. Consequently, it prompts a broader re-evaluation and encourages theorists to adapt or expand these models to reflect the complexities of user satisfaction more accurately. Specifically, it calls for a more holistic approach to studying users' interactions with technology, considering a more comprehensive display of features contributing to satisfaction and overall user experience. This could lead to the development of additional models that better predict user behaviours and satisfaction across different applications and contexts.

Importance of perceived usefulness, information value, and app enjoyment:

Consistent with prior research (Hsiao *et al*., 2016; Kim *et al*., 2021), study 2 reaffirms the significance of perceived usefulness, information value, and enjoyment in influencing app satisfaction. The emphasis on providing interactive features that cater to specific event-related needs highlights the potential of app technologies to elevate the sports tourism experience, enriching the technology literature with insights into user engagement strategies, and extending the TAM model.

App satisfaction's impact on event experiences:

This research identifies a direct and positive impact of app satisfaction on event experiences, aligning with previous findings that app technology enhances event engagement and enjoyment (Li *et al*., 2019; Talantis *et al*., 2020). By demonstrating how satisfying app experiences contribute to overall event satisfaction, study 2 makes a paramount addition to the events literature, underlining the pivotal role of technology in creating memorable and engaging sports tourism events. It highlights the potential of well-designed app features to facilitate seamless event participation and achieve

event goals, thereby enhancing participants' event experiences. This finding is particularly significant as it addresses a previously underexplored area in the literature, establishing a clear and impactful connection between technology use and the event's overall experience (Funk, 2017; Liu *et al.*, 2023).

Influence of event experiences on behavioural outcomes:

Study 2 reveals that positive event experiences, facilitated by satisfying app technology, lead to enhanced behavioural intentions, place attachment, and affective commitment. This finding enriches the events and sports tourism literature by showcasing how technology-enhanced experiences can foster deeper emotional connections with the event and motivate positive participants' behaviours, such as future participation and word-of-mouth promotion (Matute *et al.*, 2016).

Complex relationship between place attachment and behavioural intentions:

Despite expectations, study 2 found a non-significant relationship between place attachment and behavioural intentions, challenging prior assumptions within the events and sports tourism literature (Loureiro, 2014; Palau-Saumell *et al*., 2019). This suggests that in the context of intense sports events like Transpyr, other experiential factors may play a more dominant role in shaping participants' behavioural intentions. This contribution prompts a re-evaluation of the direct impact of place attachment on behaviours, suggesting that the dynamics of event experiences and their influence on attendees' behaviours are more complex than previously understood.

Overall, study 2 significantly contributes to the understanding of how mobile app technologies can enhance sports tourism event experiences and influence participants' behaviours. By offering new insights into the factors that drive app satisfaction and its subsequent effects on event engagement, this research expands the theoretical foundations of event management, sports tourism, and technology adoption, providing valuable directions for future research.

5.1.3. Theoretical contributions towards esports and psychology literatures

Study 3 makes significant theoretical contributions to the esports, psychology, and technology literature by developing and testing a novel model that delineates the pathways leading to addictive behaviours in esports. The study's primary strength lies in its comprehensive examination of the psychological and behavioural mechanisms that underpin addictive behaviour in the context of esports, focusing on the experiential

dimensions of gaming. This study takes a comprehensive approach by integrating psychological traits, users' engagement, and technology interaction into a unified model, providing a better understanding of how individual traits and gameful experiences contribute to addictive behaviours.

Application of dual-system theory in esports:

By integrating the dual-system theory with novel constructs like seeking excellence and psychological ownership, this study broadens the theoretical framework's applicability to the esports context (Evans and Stanovich, 2013; Kahneman, 2011). This extension provides new insights into the cognitive and emotional engagement of individuals with esports, emphasising the interaction between reflective thinking and instinctual reactions. This contribution enriches the esports literature by showcasing how strategic and automatic cognitive processes jointly affect gaming performance and decision-making.

Re-evaluation of habit and addictive use relationship:

Contrary to existing assumptions, the finding of a non-significant relationship between habit and addictive use challenges conventional views in behavioural addiction research (Wölfling *et al*., 2020). This observation prompts a critical reassessment of the pathways to addiction in esports, suggesting a more complex interplay of factors beyond habitual engagement. This insight encourages further exploration into the unique determinants of addictive behaviours within esports, enhancing our theoretical understanding of consumption patterns in this domain.

Significance of self-regulation in preventing addictive use:

Confirming self-regulation deficiency as a key predictor of addictive use supports the broader behavioural addiction literature (Billieux *et al*., 2015). This finding highlights the importance of self-regulatory skills in moderating esports engagement, suggesting that interventions aimed at enhancing self-control could be beneficial in reducing addiction risks among players. This theoretical implication enriches the esports and psychology literature by highlighting self-regulation's role in maintaining healthy gaming habits.

Dynamics between seeking excellence, habit, and addiction:

The positive correlation between seeking excellence and both habit formation and addictive use elucidates the dual nature of achievement motivation in esports (Ryan and Deci, 2000). While the drive for excellence can foster skill improvement, it may also lead to compulsive gaming behaviours. This nuanced understanding of motivation in esports contributes to the literature by balancing the positive aspects of striving for success with the potential for negative outcomes.

Impact of psychological ownership:

The study's exploration of psychological ownership's influence on seeking excellence and self-regulation deficiency adds depth to our comprehension of engagement in esports (Pierce *et al*., 2003). It highlights psychological ownership's ability to deepen emotional investment and engagement, which can have both beneficial and detrimental effects on players' behaviours. This finding contributes to the technology and psychology literature by delineating the complex roles of ownership feelings in the digital gaming context.

Role of gameful experiences:

By demonstrating how gameful experiences cultivate psychological ownership and the pursuit of excellence, this research aligns with and extends previous studies on game design (Xi and Hamari, 2020). It pinpoints the significance of gameful elements in shaping players' psychological states and behaviours, offering valuable insights for designing engaging and balanced esports experiences.

All in all, chapter 4 provides a multi-faceted view of the factors contributing to addictive behaviours in esports, advancing theoretical discussions in esports research and cognitive psychology. It lays the groundwork for future studies to further dissect the complex interrelations between gameful experiences, psychological constructs, and behavioural outcomes in the esports domain.

5.2. Managerial contributions

5.2.1. Practical implications about the use of gamification to drive consumers' behaviours

Study 1 offers pivotal managerial insights for app developers and marketing managers aiming to integrate gamification into branded applications. Firstly, it underscores the transition from a mere focus on gamification elements to an emphasis on experience-centric approaches in gamification strategy. Marketers are encouraged to engage customers actively in the design process, fostering a co-creative environment that incorporates user feedback from early stages. This collaborative design strategy not only enhances the gameful experience by making it more customer-centric but also optimises resource allocation, ensuring product success from the outset.

Secondly, the study provides a detailed guide for managers on leveraging gamification to foster loyalty and continuous engagement within the sports and fitness sectors. Despite the varied success of gamification in enhancing customer engagement across different organisations, this research delineates key factors that underpin customer interaction with gamified systems. The findings stress the importance of activation in the gameful experience as a critical factor in driving brand loyalty, suggesting that gamified applications should be designed to actively engage and excite users, thereby encouraging continuous app usage and interaction.

Moreover, the study highlights the direct influence of enjoyment and the minimisation of negative affect on the sustained use of branded apps. App designers are advised to prioritise the creation of emotionally engaging and enjoyable user experiences, emphasising the aesthetic appeal and incorporating narrative elements to elevate the hedonic value of the app. Furthermore, this research illustrates the mediating role of customer-brand engagement (CBE) in enhancing brand loyalty through gamification, advising marketers to design experiences that connect users more deeply with the brand. This involves creating engaging narratives, immersive environments, and offering personalisation options to empower users, thereby fostering a strong brand-user relationship.

Lastly, the study advises on tailoring gamification strategies to align with users' self-image congruity (SIC), acknowledging that higher levels of SIC may reduce the effectiveness of gameful experiences in fostering CBE. Marketers and app designers

are encouraged to develop gamified apps that resonate with users' identities and psychological needs, ensuring that gamification strategies are adaptable to diverse user profiles to maintain engagement levels.

In sum, this research underlines the significance of a strategic, experience-focused approach to gamification in branded applications, offering comprehensive insights for creating more engaging, enjoyable, and personalised user experiences. By doing so, marketers and app developers can enhance customer engagement, loyalty, and ultimately, achieve breakthrough performance results through successful gamification strategies.

5.2.2. Practical implications about the use of app technologies to drive consumers' behaviours

Study 2 outlines key strategies for event organisers and app developers in the sports tourism industry, focusing on improving attendees' satisfaction and enriching event experiences through smart app integration.

The study emphasises the importance of incorporating features that add real value for participants, such as advanced route planning, detailed obstacle descriptions, reliable offline navigation, and robust communication channels with both organisers and other attendees. By prioritising user-friendly design, attractive visuals, and smooth app functionality, developers can significantly enhance the user experience, leading to more positive perceptions of the event and stronger emotional connections.

Moreover, chapter 3 highlights the role of memorable event experiences in creating a sense of place attachment. Organisers are advised to choose unique venues, design scenic routes, and offer interactive local experiences to deepen attendees' immersion and enjoyment, fostering a lasting bond with the event location.

Promoting word-of-mouth (WOM) and electronic word-of-mouth (eWOM) is crucial for expanding the event's reach. Encouraging attendees to share their experiences on social media and other online platforms can help draw more participants to future events. Features like event-specific hashtags and spaces for user-generated content within the app can enhance visibility and engagement. Additionally, and despite the noted non-significant effect of place attachment, there is an opportunity for Destination Management Organisations (DMOs) to leverage these enriched event experiences to captivate Transpyr participants and other events and attract them as future tourists.

DMOs can play a pivotal role by integrating event experiences into broader tourism initiatives that highlight local attractions and unique regional offerings. This could involve creating tailored post-event tourism packages or marketing campaigns that link the excitement of the event with the allure of the destination, thus extending the impact beyond the immediate event experience.

Finally, the study points to the importance of leveraging positive attendees' experiences to build affective commitment. Personalising the event experience with tailored content and exclusive benefits can make participants feel valued and deepen their emotional investment. Activities that leave a lasting impression, along with fostering a sense of community and regular communication, can cultivate long-term engagement and loyalty.

In conclusion, leveraging app technology effectively can play a pivotal role in enhancing sports tourism event experiences, fostering attendee satisfaction, and encouraging long-term engagement and loyalty.

5.2.3. Practical implications about the use of esports to drive consumers' behaviours

Study 3 yields important implications for practitioners in the esports domain, specifically targeting game developers and esports managers, regarding promoting sustainable players' engagement while addressing potential addiction concerns.

Initially, the discovery that habit formation does not necessarily precipitate addiction highlights the merit in cultivating regular engagement among players. This insight suggests that game developers should craft experiences that encourage consistent play yet embed mechanisms that advocate for balanced gaming practices, such as gameplay duration notifications or limitations.

Moreover, identifying a significant linkage between self-regulation deficits and increased addiction potential pinpoints a pivotal area for proactive measures. Stakeholders in the esports arena are encouraged to integrate functionalities within games that aid players in regulating their gaming habits. This could encompass customizable gaming session boundaries or in-game educational modules highlighting the pitfalls of excessive gaming.

The association between seeking excellence and its dual impact on habit formation and addictive use shows the necessity for game designs that inspire achievement in

a manner that’s conducive to well-being. Incorporating competitive elements that drive positive motivation, alongside educational programs on maintaining equilibrium between gaming and other life activities, could mitigate risks associated with over-engagement.

Furthermore, the relationship between the pursuit of excellence and a decline in self-regulation capabilities indicates the need for esports platforms to embed features facilitating players' goal attainment in a disciplined approach. In-game mechanisms for setting objectives and tracking advancements could empower players to strive for success within a controlled environment, reducing tendencies toward compulsive gaming behaviours. The implications of psychological ownership influencing both the quest for excellence and self-regulation deficiencies stress the importance of cultivating ownership in a responsible fashion. Developers should strive to deepen players’ connections with their in-game achievements through personalised rewards and content that mirror individual efforts and progress, fostering a meaningful gaming experience.

Last but not least, the pivotal role of gameful experiences in enhancing psychological ownership and the drive for excellence illuminates the criticality of designing captivating yet responsible gaming experiences. Incorporating a variety of game modes, adjustable challenge levels, and frequent content refreshes can maintain player interest and engagement without encouraging unhealthy gaming habits.

And finally, considering gaming's broader societal impact, it is also recommended that the public administration introduce regulations requiring companies to warn players about the dangers of excessive gaming. Such regulations could include mandatory warning messages or health advisories within games and on gaming platforms aimed at increasing awareness of the potential adverse effects of prolonged gaming sessions. This policy initiative would not only help inform players but also encourage developers to prioritise the creation of healthier gaming environments.

Collectively, these insights advocate for a balanced approach to game development and management within the esports industry, aiming to ensure player engagement is nurtured in a manner that prioritises player health and sustainability in the gaming ecosystem.

5.3. Limitations and future research

Through its trio of studies, this thesis has introduced various theoretical and practical insights, naturally leading to the emergence of new inquiries for future exploration. Although specific limitations of each study are detailed within their respective chapters (chapters 2, 3, and 4), this section provides a comprehensive overview of the overarching limitations encountered across the research and proposes a research agenda within the experiences and technology context for further investigation (Table 5.1.).

First, this dissertation sheds light on the need for a more expansive application of research models across a variety of platforms, genres, and event types to enhance our understanding of user experiences and behaviours in diverse settings. By exploring a diverse range of settings, from mobile apps to gaming platforms and virtual events in other contexts, researchers can uncover nuanced insights into users' behaviours and preferences. Such a comprehensive approach enables the identification of universal patterns as well as context-specific dynamics that influence users' interactions. This endeavour will not only enrich the theoretical foundation within the fields of technology and experiences but will also provide practical insights for designing more user-centric digital experiences.

Second, there's a notable call for diversifying the used methodology. Quantitative research was used across all 3 chapters of this thesis. The decision to use quantitative methods was driven by their effectiveness in breaking down relationships among variables, testing causal models, and facilitating the generalisation of findings, as highlighted by Baker and Hart (2008). Nonetheless, incorporating qualitative methodologies could have offered deeper insights and a more nuanced understanding of consumers' interactions with the different technologies. Additionally, the use of longitudinal studies to trace behavioural changes over time, as well as the incorporation of observational data will contribute to achieving a more comprehensive view of users' interactions and perceptions. Therefore, based on this acknowledgment, it is recommended that future investigations explore these subjects through different lenses to enhance the robustness of the present findings.

Third, an additional limitation is related to the data collection method. All studies used data collection through an online survey. And while common method bias was

assessed, the data came from a single respondent one-time survey, thus potentially diminishing the richness of the study's insights. Therefore, future investigations could benefit from employing experimental designs to delve deeper into the causative relationships among the studied constructs. And to enhance external validity and more accurately reflect real-world scenarios, future studies are encouraged to implement field experiments as well. This approach would allow for a more practical examination of the theories and constructs in question, providing insights that are directly applicable to real-world settings.

Finally, future research is also encouraged to consider a broader range of external variables—including individual characteristics, environmental factors, and social influences—to unravel the complex dynamics that shape digital experiences and outcomes. Moreover, addressing the constraints imposed by convenience sampling and subjective measures, future investigations could benefit from adopting probability sampling techniques and integrating objective measures to substantiate and enrich findings.

Table 5.1. Summary of limitations and future research opportunities

Study	Limitations	Future research
1 - Gamify, engage, build loyalty: exploring the benefits of gameful experience for branded sports apps	Focus on sports and running apps	Extend the model to other sport types to see if gameful experiences vary by activity type or group dynamics. Explore the impact of other moderators / control variables on the relationships (e.g. Level of expertise)
	Focus on active users of branded apps	Study the gameful experience in non-branded apps to compare drivers of engagement and loyalty
	Convenience sampling method may limit generalisability	Employ probability sampling for broader applicability
	Data collection via self-administered questionnaire could introduce bias	Use a combination of subjective and objective measures to assess the gameful experience
	Use of the GAMEX scale primarily; alternative frameworks might offer different insights	Consider the utility and hedonic values of apps in influencing users' behaviours and loyalty
	Examination of self-image congruity as a moderator only	Delve into the broader aspects of identity theory to understand how different dimensions of identity might interact with self-image congruity to influence the observed outcomes
2 - App-solute impact: how mobile technology shapes event experiences and attachment to places	Focus on cycling events may not generalise to other event types	Expand research to other types of events and industries to understand varying impacts of app technology
	Reliance on self-reported data could be influenced by social desirability bias	Use observational data or qualitative interviews to deepen understanding of participant behaviours and experiences
	Examination of only the direct impacts of app technology on event experiences, not considering external variables	Incorporate additional variables such as demographic factors, event-specific factors, and social influences to explore the comprehensive dynamics shaping event experiences.
3 - Gameplay to game pitfall: Unravelling problematic behaviours in Esports driven by gameful experience, psychological	Model test only within the FIFA esports environment; findings may not apply across all gaming platforms or genres	Test the model across different gaming platforms and genres to verify findings' consistency
	Cross-sectional study design does not capture the dynamic changes in behaviours over time	Conduct longitudinal studies to track changes in gaming behaviours and their effects on well-being

ownership, and seeking excellence	Geographical limitation to players in Spain might restrict broader applicability	Expand the study to different countries to explore cultural variations in gameful experiences and problematic behaviours

Source: Created by authors.

5.4. Concluding remarks

This thesis has elucidated the complex relationships between technology use and sports consumers' behaviours within the domains of esports, event experiences, and sports and fitness apps. It sought to investigate three distinct yet interrelated phenomena critical to the advancing the landscape of digital consumer engagement. Through its studies, this dissertation contributes scholarly perspectives to the expanding discourse of digital marketing, providing detailed analyses of how gameful experiences affect customer-brand engagement and other behavioural outcomes, the role of app technologies in enhancing event experiences and subsequent consequences, and the dynamics governing esports experiences in driving problematic consumers' behaviours.

These explorations yield insights critical for marketers, app developers, event organisers, and policymakers navigating these digital domains. By dissecting the specificities of each study—ranging from the psychological underpinnings of esports addiction to the enhancement of event experiences through app technologies, and the engagement strategies in sports apps—this thesis provides a rich resource for developing more effective digital strategies.

In summary, the significance of this research stems from its context-specific analyses, which delve deeply into relevant issues at the intersection of technology and consumers' behaviours. In this sense, the thesis not only advances academic understanding but also offers practical guidance for industry stakeholders aiming to optimise digital consumer engagement. This approach has facilitated the generation of targeted insights, enriching the marketing discipline with fresh knowledge and strategic direction.

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Appendix A – Measurement Scale (Chapter 2)

GAMEFUL EXPERIENCE

Enjoyment factor

ENJ1. Using [app] is fun.

ENJ2. I like using [app].

ENJ3. I think using [app] is very entertaining.

App Activation factor

AppACT1. While using [app] to practice sports, I feel activated.

AppACT2. While using [app] to practice sports, I feel nervous.

AppACT3. While using [app] to practice sports, I feel intensely excited.

AppACT4. While using [app] to practice sports, I feel excited.

Absence of negative affect factor

ANA1. While using [app] to practice sports, I feel upset.

ANA2. While using [app] to practice sports, I feel hostile.

ANA3. While using [app] to practice sports, I feel frustrated.

Absorption factor

Ab1. Using [app] made me forget where I am.

Ab2. I forget about my immediate surroundings when I use [app].

Ab3. Using [app] “got me away from it all.”

Ab4. While using [app], I am completely oblivious to everything around me.

Ab5. While using [app], I lose track of time.

Dominance factor

Dom1. While using [app] to practice sports, I feel in charge.

Dom2. While using [app] to practice sports, I feel influential.

Dom3. While using [app] to practice sports, I feel autonomous.

Dom4. While using [app] to practice sports, I feel confident.

Creative thinking factor

CT1. While using [app] to practice sports, I feel that it sparks my imagination.

CT2. While using [app] to practice sports, I feel creative.

CT3. While using [app] to practice sports, I feel that I could explore things.

CT4. While using [app] to practice sports, I feel adventurous.

CUSTOMER BRAND ENGAGEMENT

Cognitive processing factor

CP1. Using [brand's] products gets me to think about [brand].

CP2. I think a lot about [brand] when using its products.

CP3. Using [brand's] products stimulates my interest to learn more about [brand].

Activation factor

ACT1. I spend a lot of time using [brand's] products compared to other brands.

ACT2. Whenever I do sports, I usually use [brand's] products.

ACT3. I use [brand's] products the most.

Affection factor

AFF1. I feel very positive when I use the [brand].

AFF2. Using [brand's] products makes me happy.

AFF3. I feel good when I use [brand's] products.

AFF4. I am proud to use [brand's] products.

Brand Loyalty

LOY1. I consider myself to be loyal to [brand].

LOY2. I enjoy purchasing from [brand].

LOY3. I will not buy other brands if [brand] is available at the market.

LOY4. I would advise other people to buy [brand].

Behavioural Intention to Use

INT1. I will use [app] on a regular basis in the future.

INT2. I will frequently use [app] in the future.

INT3. Assuming I have access to the mobile phone, I intend to use [app].

INT4. Given that I have access to the mobile phone, I predict that I would use [app].

Self-Image Congruity

SIC1. Practicing sports helps maintain my image and character.

SIC2. Practicing sports helps reflect who I am.

SIC3. Practicing sports fits well with my image.

Appendix B – Measurement Scale (Chapter 3)

Perceived Ease of Use

PEOU1. I believe that using Komoot does not require a lot of mental effort.

PEOU2. The interaction with Komoot is clear and understandable.

PEOU3. I find Komoot easy to use.

Perceived Usefulness

PU1. Using Komoot improves my performance in the race.

PU2. Using Komoot enhances my effectiveness in the race.

PU3. Using Komoot increases my productivity in the race.

PU4. Using Komoot is useful for improving my performance in the race.

Perceived Information Value

PIV1. Komoot provides comprehensive information about the race.

PIV2. The information provided by Komoot about the race is relevant.

PIV3. The information provided by Komoot about the race is accurate.

PIV4. The information provided by Komoot about the race is helpful.

App Enjoyment

ENJ_APP1. I enjoy using Komoot very much in the Transpyr race.

ENJ_APP2. This app is fun to use in Transpyr.

ENJ_APP3. I would describe this app as very interesting to Transpyr race.

ENJ_APP4. I think this app is quite enjoyable to use during the Transpyr race.

App Satisfaction

SAT_APP1. I am satisfied with the use of Komoot in the Transpyr.

SAT_APP2. I am satisfied with using Komoot in the Transpyr.

SAT_APP3. I think it was a good decision to use Komoot in the Transpyr.

EVENT EXPERIENCE

Escape

ESC1. While I participate in Transpyr, I feel like I was in another world.

ESC2. While I participate in Transpyr, I get away from it all.

ESC3. While I participate in Transpyr, I get so involved that I forget everything else.

Learning

LEAR1. I am expanding my understanding about Transpyr.

LEAR2. I am gaining information and knowledge about Transpyr.

LEAR3. I am learning many different things about Transpyr.

Enjoyment of the Event

ENJ_EV1. I am having fun participating in Transpyr.

ENJ_EV2. I am enjoying being in Transpyr.

ENJ_EV3. I am getting a lot of pleasure from Transpyr.

PLACE ATTACHMENT

Dependence

DEP1. The Pyrenees can't be substituted by other cycling destinations.

DEP2. The Pyrenees is the best cycling destination in Europe.

DEP3. The Pyrenees has sufficient cycling routes.

Place Identity

ID1. I strongly identify with the Pyrenees.

ID2. I am proud of the Pyrenees after sharing this experience with others.

ID3. To go on a cycling race through the Pyrenees says a lot about who I am.

BEHAVIOURAL INTENTIONS

eWOM

eWOM1. It is very likely that I will write positive things about Transpyr on social networks.

eWOM2. It is very likely that I will post positive reviews about the Transpyr event on websites and/or sports' events review websites.

eWOM3. It is very likely that I will upload photos and/or videos on social networks about my journey at the Transpyr event.

WOM

WOM1. I would talk positively about attending the Transpyr event to others.

WOM2. I would recommend this professional race to my colleagues.

WOM3. If my colleagues were looking for a cycling sports' event, I would tell them to attend the Transpyr one.

Intention to participate

INT1. I have the intention to take part in the Transpyr future editions.

INT2. I intend to actively participate in the Transpyr future editions.

Affective Commitment

COM1. I would have a sense of belonging at Transpyr.

COM2. Although there are other cycling events' alternatives, I still want to go to Transpyr.

COM3. I am “emotionally attached” to attending Transpyr in the future.

Appendix C – Measurement Scale (Chapter 4)

GAMEFUL EXPERIENCE

Enjoyment factor

ENJ1. Playing FIFA is fun.

ENJ2. I like playing FIFA.

ENJ3. I enjoy playing FIFA very much.

ENJ4. My game experience with FIFA is pleasurable.

ENJ5. I think playing FIFA is very entertaining.

Activation factor

ACT1. While playing FIFA, I feel activated.

ACT2. While playing FIFA, I feel jittery/nervous.

ACT3. While playing FIFA, I feel excited.

Absence of negative affect factor

ANA1. While playing FIFA, I feel upset.

ANA2. While playing FIFA, I feel hostile.

ANA3. While playing FIFA, I feel frustrated.

Absorption factor

Ab1. Playing FIFA “got me away from it all.”

Ab2. While playing FIFA, I am completely oblivious to everything around me.

Ab3. While playing FIFA, I lose track of time.

Dominance factor

Dom1. While playing FIFA, I have the feeling of being in charge.

Dom2. While playing FIFA, I feel influential.

Dom3. While playing FIFA, I feel autonomous.

Dom4. While playing FIFA, I feel confident.

Creative thinking factor

CT1. Playing FIFA sparks my imagination.

CT2. While playing FIFA, I feel creative.

CT3. While playing FIFA, I feel that I could explore things.

CT4. While playing FIFA, I feel adventurous.

Psychological Ownership

PO1. I feel a very high degree of personal ownership of my FIFA team.

PO2. I feel like the FIFA team belongs to me.

PO3. I feel a strong sense of closeness with my FIFA team.

PO4. The FIFA team incorporates a part of myself.

Seeking Excellence

SE1. I maintain a good standard in all my FIFA playing.

SE2. I am very good at focusing my efforts on playing FIFA.

SE3. I have extremely high goals while playing FIFA.

SE4. Other people seem to accept lower standards in playing FIFA than my own.

SE5. I expect higher performance in playing FIFA.

Gaming Habit

HAB1. Playing FIFA is one of my habits.

HAB2. Playing FIFA is quite automatic for me.

HAB3. Playing FIFA is natural to me.

Self-Regulation Deficiency

SRD1. It would be difficult for me to go for a day without playing FIFA.

SRD2. I have tried to cut back on FIFA playing, but I can't seem to do it.

SRD3. When I have not been playing FIFA for some time, I am not preoccupied with the thought of playing.

SRD4. I would not feel bad if I was unable to play FIFA.

SRD5. I do not think obsessively about playing FIFA when I am not playing.

SRD6. I do not have difficulty controlling the amount of time spent on FIFA.

SRD7. I can resist the urge to play FIFA.

Addictive Use

ADD1. I sometimes neglect important things because of my interest in FIFA.

ADD2. I often fail to get enough rest because of my FIFA play.

ADD3. My social life has sometimes suffered because of my FIFA play.

ADD4. Arguments have sometimes arisen because of the time I spend on FIFA.

ADD5. Playing FIFA has sometimes interfered with other work or study.

ADD6. I am sometimes late for engagements because of my FIFA play.

ADD7. When I am not playing FIFA, I often feel agitated.

ADD8. I think that I am addicted to FIFA.