The Usage of Digital Products and their Impact on Sport-related Engagement Behaviours: An Empirical Investigation in the German Professional Soccer Industry

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List of Abbreviations

AI	Artificial intelligence
AR	Augmented Reality
B2B	Business-to-business
B2C	Business-to-customer
BIRGing	Basking in reflected glory
CORFing	Cutting off reflected failure
DFL	Deutsche Fußball Liga
ECT	Expectation Confirmation Theory
GDP	Gross domestic product
IDC	International Data Corporation
IoT	Internet of Things
IQR	Interquartile range
OTT	Over-the-top television
OVD	Online video distribution
PCM	Psychological Continuum Model
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
TAM	Technology Acceptance Model
VR	Virtual Reality

Abstract

The following study examines the relationship between fans' usage of digital products and their sport-related behaviours in the German professional soccer industry. Besides the general relationship between the two variables, a closer look is taken at the impact of the usage of virtual and augmented reality on the attendance of sporting events, the usage of streaming on watching games, the usage of e-commerce on the purchase of team products, and the usage of online news services on reading sports news. Further, the role of satisfaction as a mediator is analysed in the respective relationships. Findings from a survey indicate that overall sport-related behaviours are not predictable from the usage of digital products in general. Still, the usage of the individual digital product shall be regarded when considering the respective sport-related behaviours – significant correlations between the specific digital product and their corresponding sport-related behaviour were found. Although satisfaction is not confirmed to be a mediator, usage of digital products is a strong predictor regarding the satisfaction of the individual's usage.

Abstrato

O estudo seguinte examina a relação entre a utilização de produtos digitais pelos adeptos e os seus comportamentos relacionados com o desporto na indústria do futebol profissional alemão. Para além da relação geral entre as duas variáveis, é analisado mais de perto o impacto da utilização da realidade virtual e aumentada na frequência de eventos desportivos, a utilização de streaming na observação de jogos, a utilização do comércio electrónico na compra de produtos de equipa, e a utilização de serviços de notícias online na leitura de notícias desportivas. Além disso, o papel da satisfação como mediador é analisado nas respectivas relações. Os resultados de um inquérito indicam que os comportamentos gerais relacionados com o desporto não são previsíveis a partir da utilização de produtos digitais em geral. Ainda assim, a utilização do produto digital individual deve ser considerada ao considerar os respectivos comportamentos relacionados com o desporto - foram encontradas correlações significativas entre o produto digital específico e o seu correspondente comportamento relacionado com o desporto. Embora a satisfação não esteja confirmada como sendo um mediador, a utilização de produtos digitais é um forte indicador da satisfação da utilização do indivíduo.

1 Introduction

1.1 Motivation and Problem Statement

Today, digitalization affects businesses and individuals finding themselves in a constantly changing digital environment (Rossato & Castellani, 2020; Wiengarten & Zwick, 2017). The usage rates of products such as television or radio have been high for several years, and other products, such as smartphones or tablets, are increasing (Adler et al., 2021, p. 4). Additionally, according to the same study, the usage rate of watching videos online, online shopping, or online news services remains high or is rising as well (Adler et al., 2021, p. 60). Therefore, researchers have considered examining the effect of digital product usage. It has been given particular attention in the business environment where digital products affect organizational behaviour, employees' work, and job satisfaction (van Knippenberg et al., 2015).

What has been less considered is the influence of digital products in the sports environment. Although research even though little has been done on the impact of digitalization on the sports industry, the influence digital products have on fan behaviour needs to be more researched (Xiao et al., 2017). Furthermore, the environment of digital products and fan behaviour in the soccer industry, especially in Germany, should be considered more. This might be because the German professional soccer industry needs to catch up in the adoption of technologies compared to other countries (Plattfaut & Koch, 2021). Although studies partly disclose what products (German) sports and soccer fans are using to interact with a sport or club, it remains unclear how the usage of digital products in everyday life affects their engagement activities with a sport or club (Flanquart et al., 2020; S. Schmidt et al., 2019).

As the German professional soccer industry accounted for total annual revenue of over €4 billion in the season 2020/21, it is even more essential to acquire knowledge on how the fans' usage of digital products affects their behaviour – also because fans significantly impact revenue due to, e.g., visiting games (Deutsche Fussball Liga, 2022, p. 2). Hence, this thesis investigates fans' usage of digital products in the German professional soccer industry and how this influences their behavioural activity towards the sport or their favourite club.

1.2 Research Question

In order to provide a scientific approach, a subset of the engagement behaviour types is analysed. Precisely, the sport-related engagement behaviours of fans by Yoshida et al. (2014) are covered, and the impact of the usage of digital products on them is addressed. For this purpose, the digital products containing a great influence on the respective behaviour are

included as well (i.e., virtual (VR) and augmented reality (AR), streaming, e-commerce, and online news services). The research aims to determine digital products' role in fans' sport-related behaviours. In the scope of the research, also because of the association of usage with satisfaction, the variable satisfaction is considered in the relationship between the usage of digital products and sport-related behaviours. On these grounds, the following research question arises:

Does the usage of digital products affect the fans' sport-related engagement behaviours in the German Professional Soccer Industry, and is this relationship mediated by satisfaction?

To answer the research question, a quantitative analysis in the form of a survey is conducted and consequently analysed for potential findings.

1.3 Structure of the Thesis

To demonstrate the relevance of the research approach, chapter two provides background information on the German professional soccer industry and puts it into the context of digitalization. This is followed by an outline of key theories and the current state of research on the usage of digital products and satisfaction with them as well as on sport-related behaviours. Before proceeding to the methodology, the knowledge extracted from the literature review is used to derive the respective hypotheses. With the methodology chapter, a foundation is created to systematically approach the data gathered, while chapter four delineates the results of the conducted survey. Subsequently, the research results are explained and discussed in chapter five by considering theoretical and managerial implications. Ultimately, a conclusion is drawn, and a brief outlook is presented.

2 Theory and Literature Review

2.1 German Professional Soccer Industry

The German professional soccer industry consists of two leagues, the 1st Bundesliga and the 2nd Bundesliga, each with 18 teams. Ever since the two leagues decided to establish the league association "Deutsche Fußball Liga" (DFL) in December 2000, the DFL has taken over full responsibility for the German professional soccer leagues. Besides, soccer clubs have evolved into alone-standing brands where not thinking internationally is unimaginable. Therefore, international marketing is key and needs to be considered in the future (Huth et al., 2018; Richelieu Professor et al., 2008). Also, in terms of technological and digital evolution, the subsidiary DFL Digital Sports is responsible for creating digital awareness and satisfying the fans' needs through integrating digital products (Grüttner, 2020, p. 321ff).

The Bundesliga was established in 1962 and has evolved into one of the most important leagues in Europe and worldwide. The initial intention to promote player development rapidly changed to financial intentions. The total club income in 2017/2018 was 3,588 times higher than in 1965, reaching a value of €1.16 billion. That is why soccer has become a severe business industry where management, finance, human resources, sponsoring, and communication are omnipresent, and the commercialization of soccer comes to the fore (Hasel, 2019, p. 4).

Overall, the pandemic left a financial hole in the soccer industry. Revenues drastically fell, and clubs tried to stay afloat through salary caps and television marketing (Drewes et al., 2020). It became clear that the professional soccer industry depends on their fans interacting with the clubs by, e.g., visiting the stadium, buying merchandise, or simply following the games on TV. To benefit as much as possible from the fans and to commercialize the fan culture, it is essential to enhance the fan experience through digital products (Drewes et al., 2020; Majumdar & Naha, 2020).

2.2 Digitalization

Digitalization refers to the "use of digital technologies to innovate a business model and provide new revenue streams and value-producing opportunities in industrial ecosystems", where three functionalities can be defined: the collection of data, connectivity among digital units, and analytics to make insights valuable (Parida et al., 2019, p. 6).

Technologies such as artificial intelligence (AI), Internet of Things (IoT), VR, or AR are the reason for that. Cost savings, more accessible communication, increased productivity, and more efficient supply chains are only a few opportunities resulting from adopting

technological innovations (Amankwah-Amoah et al., 2021; Hartley & Sawaya, 2019; Parida et al., 2019). Thus, organizations are heavily investing in digital transformation processes. In 2020, spending on digital transformation technologies and services worldwide accumulated to $1.31 trillion and is expected to reach $2.8 trillion in 2025 (Statista & International Data Corporation, 2021). Mainly the pandemic contributed to accelerating the digital transformation process in organizations.

The business environment is affected by digitalization and the human individual in private and work environments (Colbert et al., 2016). The fact that digital technologies and products have evolved to play a growing role in our lives can be seen by the increasing importance of the smartphone in today's society: In 2010, only 8.5 million people in Germany owned a smartphone, while in 2022, over 72 million smartphone users existed (Statista, 2022).

2.2.1 Digital Products

Technology is embedded in the core of every digital product. In a private environment, it can be a TV, a watch, or a car having integrated software, while the organizational level is replete with intelligent machines creating management systems (Yoo et al., 2012).

Digital products do not have to be fully digital and are usually incorporated into information or communication technologies (Lyytinen et al., 2016). Furthermore, digital products are dynamic and can be characterized by digital materiality, entailing the possibility of frequent modification and actualization. Examples of digital products can be enterprise systems or simply smartphones and cars (Bunduchi et al., 2022; Yoo et al., 2012).

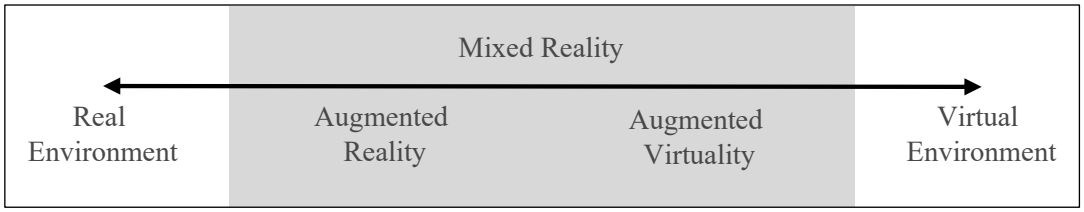
Although this paper also considers the usage of digital products in general, a focus is set on VR & AR, streaming, e-commerce, and online news services. The reasoning for considering these four digital products is given in subchapter 2.4.3.

2.2.1.1 Virtual and Augmented Reality

The term "virtual reality" was first coined in 1989 by Jaron Lanier, a pioneer in virtual projects. Many definitions of VR outline that this technology enables interaction in an alternate world or a three-dimensional situation by relying on glasses and wired clothing, such as gloves (Steuer, 1992). Definitions usually restrict virtual reality to technological hardware. Virtual reality is closely connected to the term "telepresence", which can be defined as the "experience of presence in an environment by means of a communication medium" or, in short, "the feeling of being there" (Hyun & O'Keefe, 2012, p. 29; Steuer, 1992, p. 75f).

Although VR and AR are immersive technologies, they are different. AR combines real and computer-generated elements. It refers to a mixed reality where real and virtual worlds are combined and perceived as one environment. AR is enabled through, e.g., smartphones or digital cameras (Loureiro et al., 2020; Olsson et al., 2012). To clarify the position of VR and AR in perspective to the real world, Milgram et al. (1994) developed the reality-virtuality continuum (Figure 1).

Figure 1: Reality-virtuality continuum



Source: own illustration based on Milgram et al. (1994)

On the left side, the illustration displays the real environment where the law of physics prevails. On the right side is the virtual environment or reality in which the observer is fully immersed in an unreal world. AR, a mixed reality concept, remains between the real and virtual environments, where virtual elements are integrated into the real world (Flavián et al., 2019; Milgram et al., 1994).

VR and AR have grown in acceptance and importance in many industries, such as education, retail, tourism, entertainment, healthcare, and manufacturing, and have created new opportunities (Flavián et al., 2019; Loureiro et al., 2019). Moreover, VR and AR are used in physical and online retailing to further improve the customers' shopping experience by, e.g., providing the opportunity to try on products virtually. Mobile apps featuring AR allow consumers to interact with products, while VR enables a full virtual experience with a product at home (Bonetti et al., 2018, p. 119ff). Various VR and AR applications can be found in the entertainment industry, especially for gaming. Also, social media companies, such as Facebook (now Meta), use AR and VR by, e.g., providing the possibility to change or adapt one's look by developing or using camera filters (Javornik et al., 2022). AR is mainly used for gaming and social media, especially regarding camera filters, while VR is mainly used for gaming, travelling, and watching movies. Besides, it is predicted that VR and AR glasses will replace smartphones in the future (Klöß, 2021, p. 30ff).

Due to VR and AR both being categorized as immersive technologies, this thesis considers them as one digital product group.

2.2.1.2 Streaming

Today, streaming is known for its "limitless way of distributing and consuming media content" (Spilker & Colbjørnsen, 2020, p. 1211). Although the term was not present in the 19th century, the concept of streaming had already been established as music and camera materials were streamed from one location to another via non-digital ways, such as a telephonoscope (Burroughs, 2019). In the 1970s, the term was raised digitally for the first time, though restrained to textual streaming. Spilker & Colbjørnsen (2020) report that the rise of the internet prompted radio stations to broadcast their audio content online, entailing a disruption of the music industry by services such as iTunes. Visual streaming was technologically more challenging than audio streaming but began to disrupt the traditional TV broadcast service in 2005, with YouTube being the first video streaming platform to go viral. Since then, many visual streaming platforms have evolved, appeared, and disappeared from the market (Spilker & Colbjørnsen, 2020). Over-the-top television (OTT) and online video distribution (OVD) were previously used to describe the services of streaming providers. Often, these streaming providers follow a subscription-based service where users can only access the service, usually a wide variety of video materials, in exchange for a fee (Snyman & Gilliard, 2019).

There are several types or dimensions of streaming. For example, there exists a difference between professional streaming, where the content is published by the streaming providers (e.g., Netflix, Amazon Prime) and user-generated streaming, where the content is published by its users (Twitch, YouTube) (Pires & Simon, 2015; Spilker & Colbjørnsen, 2020). Besides, there is live streaming for, e.g., live sports events and on-demand streaming, where videos can be retrieved anytime. For the sake of this analysis, live and on-demand streaming are both considered.

The video streaming industry has constantly been growing, reaching a market value of $376.06 billion in 2020, and is expected to grow at a compounded annual growth rate (CAGR) of 12.1% until 2028 (Fortune Business Insights, 2022). In 2021, over half of the German population used streaming services, although it must be mentioned that the usage rate is decreasing with increasing age. Accordingly, the age group from 14-29 uses streaming services the most (Beisch et al., 2021). Thus, the literature researches the transition from traditional TV to internet-based video streaming (Kohli, 2020; Meneses et al., 2022; Spilker & Colbjørnsen, 2020).

2.2.1.3 E-commerce

Electronic commerce, short e-commerce, is an "economic activity of buying and selling products and services through online platforms" (Pantelimon et al., 2020). According to the Global E-commerce Forecast (2022), e-commerce is an ever-growing industry, reaching $4.938 trillion in sales worldwide in 2021. In Germany, more than 60 million people used e-commerce in 2020, which is expected to grow to 68 million users in 2025 (Statista, 2020). Research has found that the growth of e-commerce in Germany positively affects Germany's gross domestic product (GDP) and that the pandemic positively influences this relationship (Pantelimon et al., 2020). The main reason for the upswing and usage of e-commerce is the convenience of buying products anytime from any place possible (Santos et al., 2017).

As this paper seeks to analyse the consumer behaviour of the end customer, only types where the end customer is targeted are applicable.

2.2.1.4 Online News Services

According to Yegen (2019, p. 136ff), "online news take place on various platforms and can be defined as digital news" and are based on the internet since websites provide news online.

The first organization worldwide to decide to provide news via the internet was Der Spiegel, which went online in 1994 with the name Spiegel Online, not long after Tim Berners-Lee released the first website (Lutteroth et al., 2014; Weber, 2017, p. 86). From then on, newspapers and agencies began to offer online news as one of their services and started taking advantage of this new way of providing news to readers. With the rise of Web 2.0, anyone could spread information on the web. Especially with the emergence of blogs and social media, not only news agencies commenced to make use of those by creating profiles, but also individuals (Weber, 2017, p. 88ff). Over time, digital information sources outperformed print information sources (Burggraaff & Trilling, 2020).

2.2.2 Digitalization in the German Professional Soccer Industry

As mentioned before, integrating digital products brings new opportunities across several industries, including the sports industry. Firstly, digitalization in the sports industry was related to computer technology, where analogue information in the form of, e.g., images or sounds was converted into useful information. With the emergence of the internet, digitalization got revolutionized. It influenced the role of traditional devices, such as the TV, with digital

television and alternative digital products, like video streams or social media platforms, being available (Horky & Stiehler, 2018, p. 9ff). In Germany, 66% of sports fans believe that integrating technologies enhances the overall viewing experience (Flanquart et al., 2020, p. 5). According to the same study, approximately half of the sports fans worldwide who had a positive experience with digital products inside and outside the stadium have not only increased their spending on food and beverages inside the stadium but also on merchandise, online subscriptions to watch the games, and other features to follow their sport-related behaviours (Flanquart et al., 2020, p. 14).

As digitalization is frequently disrupting the sports industry, so is the soccer industry. According to the former managing director of the DFL, Christian Seifert (2017, p. 1071f), soccer and especially the Bundesliga are key drivers of digital development in Germany. The DFL was the first soccer organization to establish its own production company for moving image content. Moreover, the subsidiary DFL Digital Sports was initiated to develop digital solutions and increase international awareness. On the one hand, digitalization can be observed off the pitch, whether through social media, applications, or streaming, but also on the pitch where goal-line technology or the analyses of video recordings in the halftime have changed the way of the game (2017, p. 1071f).

Technological developments, such as connecting a whole stadium to the internet and thus making it smart, are advanced. Smart stadiums change how stadiums operate and enhance and revolutionise how spectators experience their stadium stays (Panchanathan et al., 2017). Smart digital technologies are used in stadiums to improve fan experience through, e.g., smart seats where sensors and touch screens make the event livelier, stadium security by, e.g., using special camera technologies and digital entrance controls, operational efficiency by digitally guiding visitor flows or using mobile tickets and on the bottom-line profitability, by, e.g., integrating marketing into a stadium-application (Kainz et al., 2020, p. 401ff; Panchanathan et al., 2016).

The rise of digital products and digital developments frequently entails new opportunities and challenges. For example, self-presentation has become more important, sport is being commercialized, broadcasting rights are being auctioned between different streaming services, and the diversity of sports offers is ever-increasing, and everybody can participate and publish their voice, primarily through social media platforms (Horky & Stiehler, 2018, p. 11f).

Another innovation going global is fantasy sports, where “individuals who select “teams” of players from a pool of real-world athletes” then “participate in contests ultimately decided by aggregated statistics that reflect actual performances by their chosen player” (Hill

& Woo, 2011, p. 87). The internet boom caused the constant rise of fantasy leagues and opened another way for fans to interact with their favourite sport, player, or club via websites or smartphone applications (Ploeg, 2017).

VR and AR create many more opportunities in the sports industry, e.g., when it comes to educational purposes. With VR and AR, training cases can be individualized through simulation and imitate a real-life situation for the players, leading to physical training being partly replaced by virtual training (Xiao et al., 2017). Integrating and engaging stakeholders through VR and AR is another aspect to be considered. Another VR application the end consumer can enjoy is a virtual stadium tour. Inside 360, an agency developing VR solutions, cooperates with several Bundesliga clubs to offer VR stadium tours. Instead of an empty tour, VR glasses imitate the living atmosphere of a game event or press conference (Inside 360, n.d.). VfB Stuttgart was the first to offer a stadium tour supported by VR technology in 2018/19 (Ludwig et al., 2020, p. 30). Also, end-consumer-oriented AR applications are being used inside and outside the stadium. Fans have access and see real-time data of the players and the game by using smartphone-based fan experience applications or AR glasses (Klöß, 2021, p. 47; Uhrich, 2021). Immersive technologies are applied to engage fans, train professionals, measure sports results, or enhance marketing strategies (Sawan et al., 2020). When considering the literature on AR, and especially VR applications, it can be observed that these technologies have not reached their full potential yet. VR and AR applications are limited within the German soccer industry and are still being discussed to play a significant role in the future of soccer (Keshav, 2020).

A general trend that has been moving forward during the digital transformation process of the soccer industry is the transition from TV to streaming services (Meneses et al., 2022). However, this is not the only transition trend, as second-screen devices, such as smartphones and tablets, are continuously taking a share of first screens, like TVs. Although the television remains the first choice to watch games, a second screen is often used to track statistics or check other game day results (Lopez-Gonzalez et al., 2018; S. Schmidt et al., 2019, p. 8). Besides the traditional subscription-based services, such as Amazon Prime and Sky, other streams and video channels, like YouTube or the self-initiated Club-TV streams, are being used for engagement purposes (Ludwig et al., 2020, p. 25; S. Schmidt et al., 2019, p. 7f). According to a study from Capgemini (2020, p. 12), the age group mainly using internet-based streaming services is the one under 43, as a downturn of usage can be recognized the older the respondents get.

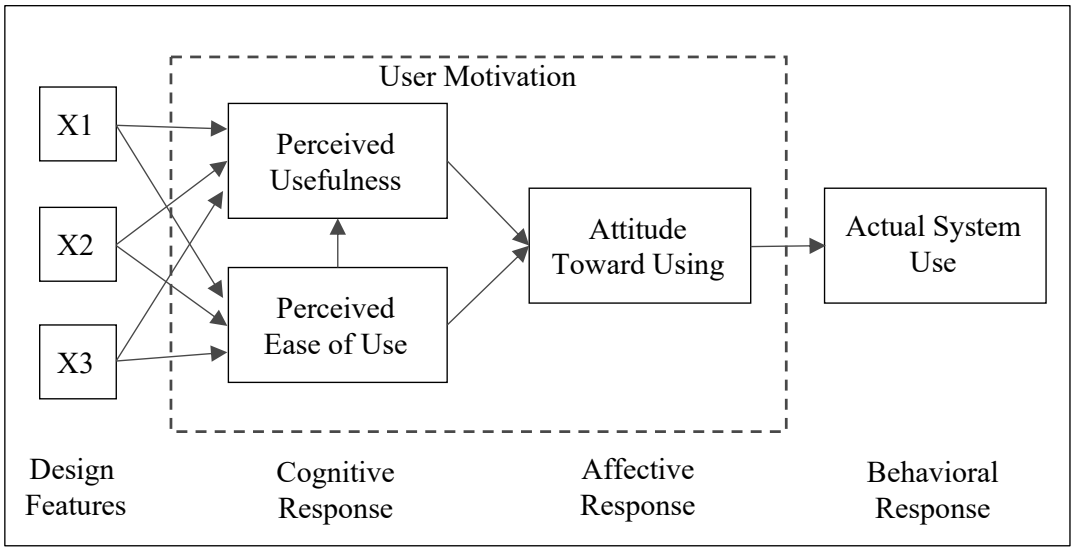
Also, the journalism industry has evolved digitally with the rise of the internet and rapidly got disrupted by online and social media. For example, online news services, such as Sky Sports News, report about the German professional soccer industry 24 hours a day, co-existing to print media (Grimmer, 2016). Moreover, social media provides real-time information from the club and user-generated information from fans. Consequently, it has become usual for clubs to provide information via their websites or applications and social media platforms (Dellea et al., 2014, p. 15ff; Vale & Fernandes, 2018).

Despite all the technological applications and the statement that soccer is a key driver of digitalization in Germany, Plattfaut & Koch (2021) found out that the German professional soccer industry is – compared to other industries – lagging behind when it comes to adopting, especially innovative, technologies. Although deploying digital products offers many advantages, it also bears risks. Risks, such as negative acceptance from supporters, seem to outweigh the advantages and hinder technological adoption. Nevertheless, the German soccer industry is ultimately forced to use and offer digital technologies to stay competitive internationally, as other leagues seem to be digitally further developed than the Bundesliga. To stay competitive and be digitally successful, fans need to accept the technologies (Plattfaut & Koch, 2021).

2.2.3 Determinants of Technology Acceptance

The Technology Acceptance Model (TAM) was developed by Fred Davis in 1980 to understand why people started using a specific information system and provide theoretical insights into a new field (Davis, 1985). The model is also suitable for digital or technological products as Davis applies the variables to determine user acceptance of computer usage (Davis, 1989). The TAM is the most known model for explaining users' technology adoption behaviour and has been extended and developed multiple times across multiple industries, such as e-learning or gaming (Marangunić & Granić, 2015). In more recent literature, the TAM is known as the "quick and inexpensive way to gather information about individuals' perception of a system" (Fan et al., 2017, p. 115). An overview of the model is displayed to understand what the original model looks like and to what extent it is meaningful to this paper (Figure 2).

Figure 2: Technology Acceptance Model (TAM)



Source: own illustration based on Davis (1985)

Whether a person decides to use a digital product or system depends on the person's attitude towards the product. A positive attitude leads to acceptance, while a negative one leads to rejection. The attitude towards a product is formed by the variables perceived usefulness (PU) and perceived ease of use (PEOU). PU is the level of expected added value to one's performance by using the product or system, and PEOU is the expected effort required to invest to use the product or system. In addition, the usability of a product or system depends on its design features and how individuals cope with them (Davis, 1985).

As mentioned, the model has been extended multiple times, also by Davis himself – with further variables, such as perceived enjoyment. Still, if the cognitive and affective responses are positive, so is the behavioural response (Davis, 1989). Just as other researchers have applied this model to argue the respective usage and behaviour of, e.g., information and communication technology, so does this paper, by using the TAM to reason the potential usage behaviour of the four before mentioned digital products (Gibson & O'Rawe, 2018, p. 93ff). Once the digital product or system is adopted, a behavioural change follows as the product is integrated into the individual's private or work life.

2.2.4 Technology and Adoption Behaviour

What has already been mentioned above is that the adoption of digital products entails a change in one's own behaviour by, e.g., having the opportunity to read sports news online instead of using print media. Also, post-adoption behaviour must be considered, meaning

whether digital product usage is continued or discontinued, affecting the behavioural outcome (Parthasarathy & Bhattacherjee, 1998).

Implementing information and communication systems within organizations is only effective when the workforce adopts them, which entails many challenges and can consume much managerial time (Schermerhorn et al., 2002, p. 92f & 220f; van Knippenberg et al., 2015). Once the technologies are adopted, behavioural changes within the organizations can be detected. Social, digital products, such as emails or videoconferences, not only affect the employees' behaviour on an organizational level but also increase efficiency, effectiveness, and competitiveness. Technology has changed and will further change how organizations and workplaces work. They ultimately have a behavioural effect on the individual by changing information flows, access to digital products, and their usage with them (van Knippenberg et al., 2015). Primarily the pandemic has led to organizational change since a shift to full or partial remote work implied a behavioural change in the employees. This entailed new working structures as the employees are even more dependent on digital products when working and having virtual meetings from home (Leonardi, 2021).

The increasing adoption of technologies in the work environment also interferes with the private life of individuals. For instance, the existence of smartphones, tablets, and other devices entails a change in behaviour on a personal level (van Knippenberg et al., 2015). Besides, the emergence of VR, smartwatches, and digital channels, such as social media platforms, have changed and shaped individuals' behaviour and interactions (Matt et al., 2019). Adopting digital products in private life has led to a drastic change in living. Due to communication technologies, individuals find themselves in constant personal information exchange, while social media enables others to see a chronic display of one's life (Colbert et al., 2016). Moreover, research has found that using digital products affects people's behaviour regarding their interaction with others. Technology has given people substitutes for establishing and maintaining social connections. Networked devices can now follow what once had to be done face-to-face (Turkle, 2017, p. 35). Technology, with its speed and indefatigability, has intensified engagement. Once a digital product is adopted, it becomes part of one's life and is integrated into social behaviour. Adopting digital products has changed deep-rooted social-behavioural structures, such as dating or travelling (Turkle, 2017, p. 235 & 265ff).

2.3 Satisfaction with Digital Products

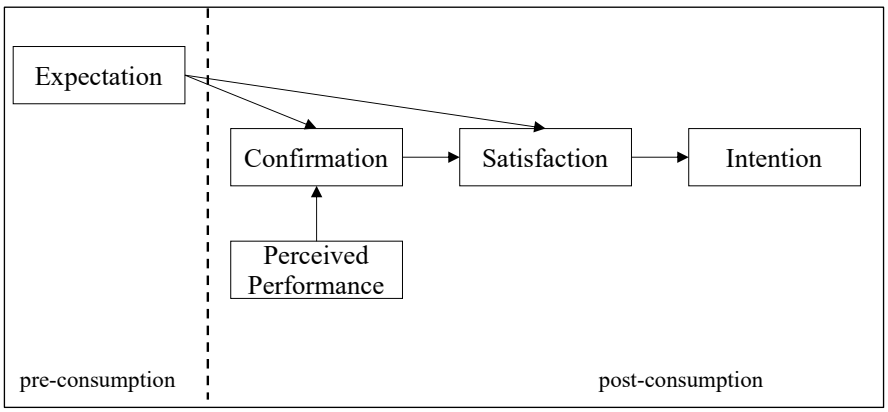
The purpose of a product or service is to reach consumer satisfaction by fulfilling their needs. The literature describes satisfaction as the discrepancy between the expectation and the perceived performance of a product or service (Oliver, 1980; Spreng et al., 1996).

2.3.1 Antecedents of Satisfaction and Expectation Confirmation Theory

Antecedents of satisfaction differ across products and services but are related to the individual's expectations and the resulting confirmation or disconfirmation of these. Literature focusing on digital products, such as website services, mobile applications, information systems, or e-commerce, has found that factors like information and service quality, variety, information availability, design, performance, and reliability are regarded as antecedents of satisfaction (Alam & Yasin, 2010; McKinney et al., 2002; Niros et al., 2019; Szrek, 2017).

The Expectation Confirmation Theory (ECT) is suitable for this thesis as it has been applied widely in the consumer literature to provide a comprehensive understanding of the consumers' satisfaction with, e.g., digital products and their post-adoption behaviour (Bhattacherjee, 2001). Figure 3 shows a graphical depiction of the ECT.

Figure 3: Expectation-Confirmation Theory (ECT)



Source: own illustration based on Oliver (1980)

A behavioural intention, such as repurchasing or continuing an existing behaviour, is determined by the person being satisfied with the usage of a product or service (Lin et al., 2005; Oliver, 1980). From the origin, it is common for an individual to have a specific expectation towards a product or service before having purchased and used it. Once the adoption or purchase of the product is conducted, there are two possible outcomes. Either the perceived performance of a product or service exceeds expectations, leading to confirmation, or the performance falls

below expectations, leading to disconfirmation (Oliver, 1980). Researchers also refer to the expectation disconfirmation model, although the ECT is meant since expectations are not always confirmed. In the case of confirmation, satisfaction results, while disconfirmation leads to dissatisfaction (Lankton & Mcknight, 2012). Prior literature used this model to support the relationship between usage, satisfaction, and behaviour (Bhattacherjee, 2001; Jin et al., 2013; Oliver, 1980; Son & Han, 2011; Spreng et al., 1996). For example, when applying the model to the digital products VR and AR, it can be assumed that once the products are used, and expectations are met, satisfaction results, and subsequently, the behaviour is adapted as the continuing usage of VR and AR is being integrated into the individual's life. This has been supported by Trail et al. (2003), who found out that confirmation and disconfirmation of expectations from fans are a factor influencing the consumption of sport-related behaviours, such as buying merchandise.

While confirmation and the resulting satisfaction of a product or service influence the behavioural outcome, the usage must also be considered (Bhattacherjee, 2001; Jin et al., 2013).

2.3.2 Usage of Digital Products and Satisfaction

The interrelation between the usage of digital products and satisfaction with them is widely covered in the literature. According to Bhattacherjee's (2001) findings, which are also based on the TAM and the ECT, people using an information system, and being satisfied with it, are showing continuing behaviour as the usage of the respective information systems is further pursued. Moreover, he integrates the variable PU of the TAM in his ECT model and finds out that PU has a positive effect on satisfaction. That means a positive PU of a digital product leads to technology acceptance, subsequent use, and satisfaction. This is relevant for this research since a positive relationship between digital product usage and satisfaction with it is suggested.

As mentioned, digital products affect organizations and their employees by, e.g., changing their work structures. Though not only their work behaviour is influenced, but also their job satisfaction (Limbu et al., 2014). Job satisfaction is positively affected when not avoiding but fully adopting the technology and exploring and exploiting all advantages. The other way around, avoiding adopting a technology does not necessarily result in dissatisfaction, only when the technology must be adopted, although it is not wanted. Thus, avoidance will not lead to the enrichment or transformation of a work environment, as everything remains the same. Avoidance, or non-using a digital product, does not entail a behavioural change (Bala & Venkatesh, 2016).

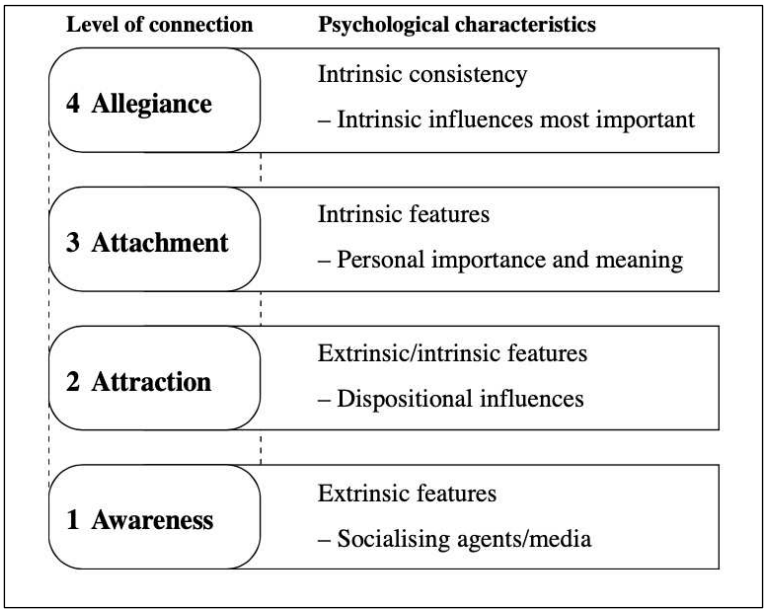
This research does not focus on the usage and satisfaction of digital products in, e.g., work environments and how work or private behaviour is affected but more on how the usage of digital products and the implied satisfaction with them impacts sport-related behaviours.

2.4 Engagement Behaviours in Sports

2.4.1 The Sports Fan

This study does not distinguish between fan types in particular but includes anyone who considers themselves a fan. The connections a fan builds to a sport or club can be explained at different levels in the Psychological Continuum Model (PCM) developed by Funk and James (2001). The PCM was developed to support systematic studies on sports fans and spectators. Depending on how solid fans and spectators relate to a sports object, like a team or a sport, they find themselves along the vertical PCM in one of the different levels (Funk & James, 2001; Wann & James, 2019, p. 26ff). Figure 4 displays the PCM and supports the explanation.

Figure 4: Psychological Continuum Model (PCM)



Source: Funk & James (2001)

The PCM exists out of four stages: awareness, attraction, attachment, and allegiance. The four terms represent the level of connection to the sports club. On the right-hand side, the essential characteristics of the cognitive approach are noted (Funk & James, 2001). The structure of the model already indicates that the key message of the model is the psychological link between a person and a sport or club (Beaton & Funk, 2008). The first step to building a

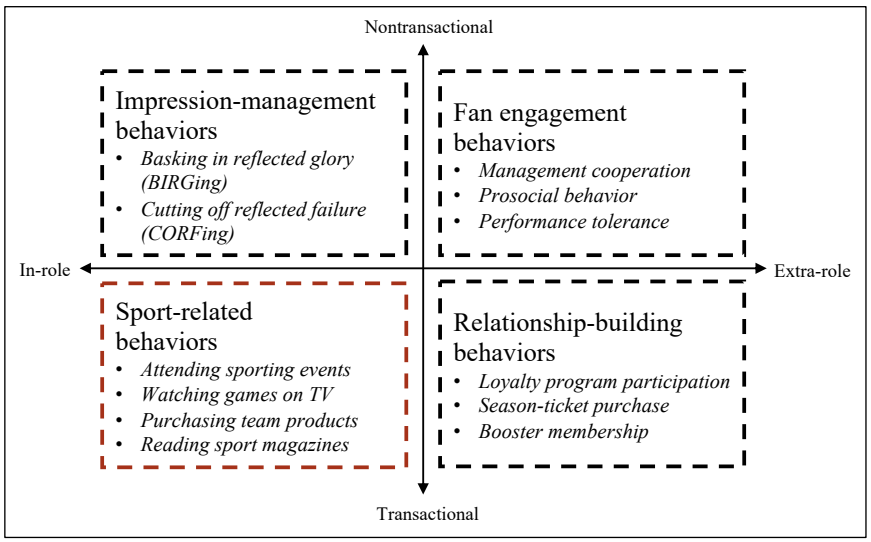
psychological connection to a club or team is through the concept of awareness. At this level, an individual knows about the existence of a team or sport. Attraction is the level where sport-related behaviours, such as watching or attending games and buying team products, first occur, though on an unstable basis. Once an individual has built a solid relationship with a sport or team solely based on intrinsic motivation, the level of attachment is reached. At this level, an external factor is unlikely to influence the decision to follow a team or sport. The last and strongest level of connection is allegiance. Allegiance represents the loyalty an individual shows towards a team or sport. (Funk & James, 2001; Wann & James, 2019, p. 27ff). This thesis study focuses on any fan having a favourite team. That is why this study covers three levels of connection: attraction, attachment, and allegiance. These three levels differ in their psychological connection strength to a sport or team (Funk & James, 2001).
The PCM must be adapted regarding technological aspects influencing sport-related fan behaviours (Wann & James, 2019, p. 219f).

2.4.2 Four Types of Engagement Behaviours – a Framework

Throughout this paper, the research question has been broken down into three categories which have been structurally explained and analysed. Digitalization and satisfaction have been covered, leading to missing one crucial part in order to get a complete understanding of the provided results, i.e., sport-related behaviours.

For the sake of this analysis, the engagement behaviour model of Yoshida et al. (2014) is used, which displays different engagement behaviours of sports consumers (Figure 5).

Figure 5: Four types of engagement behaviour in spectator sport



Source: own illustration based on Yoshida et al. (2014)

The diagram is built with the role, in-role to extra-role, on the x-axis and consumer behaviour, either transactional or non-transactional, on the y-axis. Extra-role behaviours are interactions and intentions based on the fan's moral obligation, while in-role behaviours are based on self-interest (de Ruyter & Wetzels, 2000; Park et al., 2011). Engaging in transactional behaviours usually related to in-role behaviour entails a trade-off between costs and benefits (Yoshida et al., 2014). Transactional behaviours, such as attending games or participating in fantasy leagues, have been addressed in several pieces of literature (Hunt et al., 1999; Pritchard & Funk, 2006). Non-transactional behaviour, on the other hand, does not entail any trade-off but focuses on voluntary consumer participation and social practices and can be related to, e.g., word-of-mouth (Cambra-Fierro et al., 2021; Schau et al., 2009). After having reviewed the literature, Yoshida et al. (2014) determined four types of engagement behaviours: Impression-management behaviours, fan-engagement behaviour, relationship-building behaviour and sport-related behaviours. Sport-related behaviours were narrowed down to four characteristics: attending sporting events, watching games on TV, purchasing team products, and reading sports magazines (Funk & James, 2001; Hunt et al., 1999; Pritchard & Funk, 2006).

The quadrant in the model that displays the sport-related behaviours is highlighted in red since this work focuses on the relationship between digital products and this type of engagement behaviour.

Sport-related behaviours are transactional and more in-role directed, meaning these behaviours are followed due to self-interest and in exchange for effort, time, or money (Yoshida et al., 2014). Yoshida et al. (2014) derived the four characteristics of sport-related behaviours from different sources. All sport-related behaviours are becoming stronger with the increased psychological level of connection. Individuals engage stronger in sport-related behaviours when having a closer connection to a team or sport (Funk & James, 2001; Mahony et al., 2000).

To analyse the sport-related behaviours, the characteristics need to be revised and thoroughly defined, especially regarding technological developments.

2.4.3 The Role of Digital Products in Sport-related Engagement Behaviours

Digital products do not fully replace traditional media and subsequently, the behaviours are not fully redeveloped but complemented from today's perspective (Ganz & Lewis, 2014, p. 19ff).

Firstly, the behaviour of "attending sporting events" is revised. An event is often connected to a one-time experience, such as a game where players compete in front of a crowd or a publicly watched training. Retrospectively, an event is regarded as spatiotemporally

unlimited since it is not only the game that is remembered but also the experiences before and after (A. Schmidt et al., 2000, p. 115ff). Therefore, in this paper, "attending sporting events" implies games, public training, stadium tours, press conferences, and fan club meetings. Throughout this thesis, the role of digital products in the German professional soccer industry and their influence on behaviour were analysed. Hence, for the sporting events stated above, physical attendance does not have to be required, at least to some extent.

Stadium tours assisted with VR and AR technology are possible, there has been the opportunity to watch a game of the 1st Bundesliga using VR glasses, and 5G brings the usage of AR to a new level, as live statistics can be seen via a mobile app while watching the game in the stadium (Ludwig et al., 2020, p. 23ff; S. Schmidt et al., 2019, p. 7f; Vodafone Business, n.d.). Thus, the revised version of "attending sporting events" is considered in this paper. Following games on TV is not considered a substitute for attending games in this research, with both being regarded as separate sport-related behaviours. On top of that, the literature is inconsistent about the relationship between the two, whether the behaviours are fuelling each other (Pritchard & Funk, 2006).

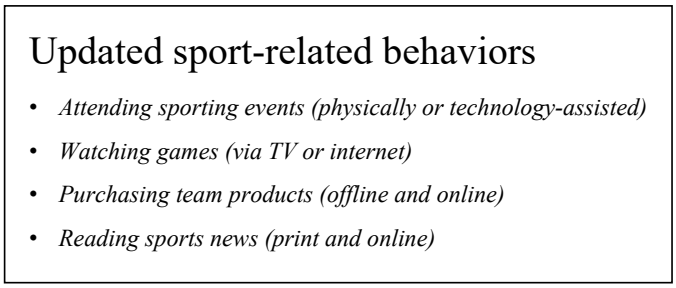
Applying the behaviour "watching games on TV" to the professional German soccer industry is unsuitable as streaming has disrupted this industry, and it is not only the TV on which games are being followed but also other devices, such as tablets or smartphones (Lopez-Gonzalez et al., 2018; Meneses et al., 2022). Furthermore, most soccer games in the German professional sports environment are streamed on the subscription-based streaming service platforms Sky and DAZN, whereas only a small number of games and match highlights are broadcasted on traditional free TV (Deutsche Fußball Liga, 2020; Tagesschau, 2020). Accordingly, "watching games on TV" is adapted to "watching games on TV or via internet" since streaming is possible on any smart device.

Although "purchasing team products" does not imply online channels, the wording can be retained since online channels are not excluded either. For this work, the behaviour "purchasing team products" also includes e-commerce as it has grown in importance for the professional soccer industry, also in Germany (Habenstein et al., 2021).

According to Holmes (2020, p. 3ff), magazines are printed only. As online news services have come to the fore, not only in the sports industry but overall, they need to be considered in the behaviour "reading sports magazines" (Burggraaff & Trilling, 2020; Grimmer, 2016). For this reason, the wording is adapted to "reading sports news" to not restrict the behaviour to any channel or medium.

The adapted sport-related behaviours are displayed in figure 6.

Figure 6: Updated sport-related behaviours of Yoshida et al. (2014)



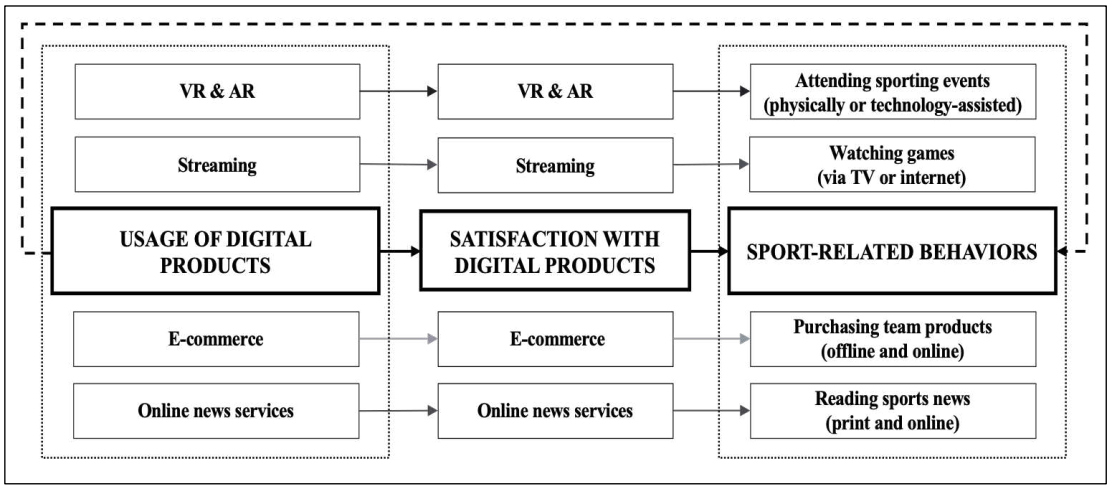
Source: own illustration

Throughout this chapter, it is recognized that the respective behaviours are updated based on certain digital products influencing them. For example, that is why VR & AR are regarded in relation to "attending sporting events", streaming to "watching games on TV", e-commerce to "purchasing team products", and online news services to "reading sports news".

2.5 Theoretical Framework and Hypothesis Development

The theory and literature chapter gives rise to examining the following developed theoretical framework (Figure 7).

Figure 7: Theoretical framework



Source: own illustration

The effect of the usage of digital products in general, and respectively of VR & AR, streaming, e-commerce, and online news services (independent variables) on sport-related behaviours overall, respectively attending sporting events, watching games, purchasing team products, and reading sports news (dependent variables) is examined. Besides, satisfaction with

digital products in general, and respectively with VR & AR, streaming, e-commerce, and online news services, is considered as the mediating variable. As can be seen, the model is structured into multiple levels, and variables are treated accordingly (e.g., streaming with satisfaction and watching games). Digital products were associated with individual behaviours because, according to the literature presented in previous chapters, they complement and supplement the respective behaviour the most.

Also, satisfaction is respectively adapted to the examined digital product. Despite the level perspective, the usage of digital products in general, the satisfaction with them, and their effect on sport-related behaviours overall are investigated since digital products, in general, are not only consisting of the four digital products focused on in this thesis.

2.5.1 Usage of Digital Products and Sport-related Behaviours

The TAM suggests that once a digital product is used, an attitude towards the digital product is developed, resulting from the individual's cognitive response. When having developed a positive attitude, a behavioural response is likely to follow what implies a change in behaviour by accepting the usage of a digital product. Conversely, a non-acceptance of a digital product would not result in a behavioural response as no digital product is adopted to disrupt an individual's behaviour. With usage being a prerequisite to establishing a behavioural response, such as showing an actual continuing usage behaviour, it is shown that the usage of an object precedes a behavioural intention (Davis, 1985; Davis, 1989).

In the sports literature, a relation between the usage of media and sport-related behaviours is detected. Although the impact of using digital products on sport-related behaviours has not been examined yet, it has been found that fans using media (electronic and print) are keener to engage in sport-related behaviours, in particular purchasing team products, and that the adoption of digital products intensifies the interaction between fans and athletes (Pritchard & Funk, 2006; Sanderson & Kassing, 2014, p. 247ff).

This state of research, in combination with the increased digitalization of the fans and the German professional soccer industry (cf. chapter 2.2.2), gives rise to examining whether the usage of digital products positively affects sport-related behaviours. Accordingly, the following hypotheses are formulated:

H1a: The usage of digital products in general will be positively related to sport-related behaviours overall.

H1b: The usage of VR & AR will be positively related to attending sporting events (physically or technology-assisted).

H1c: The usage of streaming will be positively related to watching games (via TV or internet).
H1d: The usage of e-commerce will be positively related to purchasing team products (offline or online).
H1e: The usage of online news services will be positively related to reading sports news (print and online).

2.5.2 Usage of and Satisfaction with Digital Products

Parthasarathy's & Bhattacherjee's (1998) work on post-adoption behaviour researched, among others, the relationship between discontinuing the use of a product and disenchantment with a product, seeing a positive relationship between the non-usage of a product and disenchantment. Satisfaction results from the usage of a product (Bolton & Lemon, 1999; Deng et al., 2010).

Moreover, the ECT and the TAM have both been applied using similar variables. Perceived usefulness and perceived enjoyment are antecedents of both the usage of digital products and satisfaction with them and thus have been used to describe the effect. Consequently, the variable's usage and satisfaction are closely related (Bhattacherjee, 2001; Hau et al., 2012). The ECT shows that satisfaction (or dissatisfaction) can only be achieved when having used the product before. Therefore, the usage of a product precedes either satisfaction or dissatisfaction (Bhattacherjee, 2001; Oliver, 1980).

In addition, the work of Bala & Venkatesh (2016) shall be considered to develop the respective hypotheses since they have examined a positive relationship between adopting technologies and job satisfaction, as well as the article of Son & Han (2011) confirming a positive effect of usage rate on satisfaction.

On these grounds, a positive relationship between the usage of and satisfaction with digital products is suggested, resulting in the following hypotheses:
H2a: The usage of digital products in general will be positively related to satisfaction with them.
H2b: The usage of VR & AR will be positively related to satisfaction with them.
H2c: The usage of streaming will be positively related to satisfaction with it.
H2d: The usage of e-commerce will be positively related to satisfaction with it.
H2e: The usage of online news services will be positively related to satisfaction with them.

2.5.3 Satisfaction with Digital Products and Sport-related behaviours

According to the ECT, the established satisfaction with, e.g., an information system, results in a behavioural intention, depending on whether confirmation or disconfirmation with an expectation is met (Lin et al., 2005; Oliver, 1980). The ECT has been integrated into Bhattacherjee's (2001) work, who researched continuing usage behaviour with satisfaction as an antecedent and identified a positive relationship. Parthasarathy & Bhattacherjee (1998), among others, found that an already adopted behaviour is influenced by the satisfaction level or the replacement of another adopted usage behaviour. Besides, the ECT and TAM both consider satisfaction or related variables as precursors of a behavioural response or intention.

Also, the sports literature has considered the relationship between satisfaction and behaviour. For example, according to a study from Flanquart et al. (2020, p. 14), a positive tech-related experience in- and outside the stadium can lead to stronger sport-related behaviour. Besides, Trail et al. (2003) already partly investigated the relationship between satisfaction and sport-related behaviours, where confirmation or disconfirmation of expectations lead to increased buying of merchandise.

The analysis of satisfaction and sport-related behaviours in the previous chapters and these findings give rise to test the following hypotheses:

H3a: The satisfaction with digital products in general will be positively related to sport-related behaviours overall.

H3b: The satisfaction with VR & AR will be positively related to attending sporting events (physically or technology-assisted).

H3c: The satisfaction with streaming will be positively related to watching games (via TV or internet).

H3d: The satisfaction with e-commerce will be positively related to purchasing team products (offline or online).

H3e: The satisfaction with online news services will be positively related to reading sports news (print and online).

2.5.4 Mediating Effect of Satisfaction

Once the impact of the usage of digital products is felt on sport-related behaviours, it is indicated that satisfaction surfaces between the independent and dependent variables. Although the mediated relationship between usage and behaviour has not been examined in the sports industry, literature gives rise to investigating the role of satisfaction in this theoretical framework (Bhattacherjee, 2001; Trail et al., 2003). In particular, it is the ECT and the TAM

that, compared to the suggested theoretical framework, make satisfaction a potential mediator in the relationship between the usage of digital products and sport-related behaviours. The models treat satisfaction or related elements as a motive for technology usage or behavioural response. As usage causes satisfaction, it is the satisfaction with a product that affects the behaviour, or rather the usage through satisfaction (Davis, 1985; Davis, 1989; Oliver, 1980). Furthermore, prior literature has used satisfaction as a mediator to e.g., explain customer behaviours (Fernandes & Solimun, 2018). As it is suggested that satisfaction is positively related to the dependent and independent variable, and usage precedes satisfaction and satisfaction precedes behaviour, the following hypotheses are developed:

H4a: The relationship between the usage of digital products in general and sport-related behaviours overall is mediated through satisfaction.

H4b: The relationship between the usage of VR & AR and attending sporting events (physically or technology-assisted) is mediated through satisfaction.

H4c: The relationship between the usage of streaming and watching games (via TV or internet) is mediated through satisfaction.

H4d: The relationship between the usage of e-commerce and purchasing team products (offline or online) is mediated through satisfaction.

H4e: The relationship between the usage of online news services and reading sports news (print and online) is mediated through satisfaction.

3 Methodology

The research conducted is about investigating the relationship between the usage of digital products, satisfaction, and the resulting sport-related behaviours. Therefore, a thorough research strategy is developed and displayed in the following subchapters to obtain and analyse results. In addition to aspects such as the elaboration of the research design and the data analysis procedure, attention was paid to compliance with certain quality criteria.

3.1 Research Design

The research's philosophy is to objectively determine the relationships and predictions between the dependent and independent variables. Replicability, reliability, and validity are the foundation of this deductive research and were, to some extent, statistically proven.

In chapter 2, the literature was examined to establish a theoretical framework. Together with the reviewed theory from the literature, hypotheses were developed and are to be tested. This paper seeks a quantitative research design following a hypothetico-deductive method to test them. Firstly, the problem and research question has been defined, while chapter two concludes with the hypothesis development displaying the different variables. Throughout this work, the measurements of the respective variables are derived and followed by an analysis and interpretation of the collected data. A survey has been developed and executed to achieve results on the respective variables and their relations. A descriptive research design is followed since correlations and predictions between the variables are investigated. No definite causal research design is applied due to no guaranteed full control of the independent variable as it is possible to have in experiments (Sekaran & Bougie, 2016, p. 165ff). In other words, a descriptive research design is applied as the independent variable cannot be manipulated, and it cannot be ensured whether other variables influence the dependent variable (Field, 2009, p. 12; Sekaran & Bougie, 2016, p. 44). Notwithstanding, predictions are being examined.

3.2 Sample and Procedure

The online survey with 167 responses was designed with and published via an internet survey tool (Unipark). The survey was addressed to a specific target population. Therefore, individuals could only complete the survey when considering themselves a fan of a club in the German professional soccer industry. To counteract the limited representativeness of the research, special attention was given to reaching all groups of people by covering diverse characteristics and features in the survey:

Gender

Out of 167 participants, 141 were male (84%), whereas 26 participants were female.

Age

All six age groups (from below 19 to above 60) were covered, with the strongest age group (20-29) accounting for 66% of the participants, especially due to the online survey.

Education

Another characteristic covered in the survey is the highest level of education. Individuals with high school diplomas, university degrees, and completed vocational training were successfully reached with most of the participants having obtained a university degree (54%).

Occupation

Moreover, the occupation status was detected with the objective to include a variety of individuals either being apprentices or students, employed, self-employed, retired, or without occupation. Although all categories were covered, the majority of the survey participants were apprentices or students (41%) and employed (45%).

Favourite club

The 1st and 2nd Bundesliga together consist of 36 clubs. In the survey 21 out of 36 were covered, with Hamburger SV being represented the most (46%). While 14 clubs were from the 1st Bundesliga, only seven were from the 2nd Bundesliga.

3.3 Measures

The three constructs, usage of and satisfaction with digital products and, respectively, VR & AR, streaming, e-commerce, and online news services, as well as sport-related behaviours, were measured. In total, the questionnaire consisted of 70 items to measure the variables, all following a similar scale structure – a six-point rating scale from 1 ("strongly disagree" with the statement) to 6 ("strongly agree" with the statement). A six-point Likert scale was chosen to allow the respondents to decide between an agreeing or disagreeing direction.

Accordingly, the behavioural dimensions of the participants were considered and consequently constructs, and finally, items in the form of statements were developed for each variable. Tests for internal consistency or scale reliability using Cronbach's alpha showed sufficient results and are displayed below (Cronbach, 2016). The variable sports-related behaviour overall represents all four sport-related behaviours together. In the following, a more detailed look at the constructs is taken. It was already mentioned that every construct was measured with a six-point Likert scale, an interval scale, using statements as items, and a focus on the items is set since they differ from construct to construct.

For measuring the usage of digital products in general, VR & AR, streaming, e-commerce, and online news services, the same five items (adapted to the respective digital product) were used (cf. Appendix I). According to Cronbach's alpha, the consistency of all scales was sufficient (cf. Table 1).

Table 1: Cronbach's alpha for measuring usage

Usage of…	**Number of items**	**Cronbach's alpha**
…digital products in general	5	0.899
…VR & AR	5	0.925
…streaming	5	0.919
…e-commerce	5	0.948
…online news services	5	0.928

Source: own illustration based on survey results

For the measurement of satisfaction with digital products and, respectively, VR & AR, streaming, e-commerce, and online news services, an overall satisfaction scale based on the six-point Likert scale was used. Also, for this construct, the internal reliability results were sufficient (cf. Table 2).

Table 2: Cronbach's alpha for measuring satisfaction

Satisfaction with…	**Number of items**	**Cronbach's alpha**
…digital products in general	4	0.931
…VR & AR	4	0.967
…streaming	4	0.937
…e-commerce	4	0.953
…online news services	4	0.930

Source: own illustration based on survey results

The third construct, sport-related behaviours, was measured using similar five items (adapted to the respective behaviour) for each behaviour, i.e., attending sporting events, watching games, purchasing team products, and reading sports news. As the first construct also measured frequency, some items are oriented to them (cf. Appendix I). Internal consistency was considered sufficient as well (cf. Table 3). Since sports-related behaviour overall was not measured individually, but usage of and satisfaction with digital products, in general, was, the average responses of the four sports-related behaviours were used to create a new variable representing sports-related behaviour overall. This is also relevant for hypothesis testing.

Table 3: Cronbach's alpha for measuring sport-related behaviours

Sport-related behaviours	Number of items	Cronbach's alpha
Attending sporting events	5	0.926
Watching games	5	0.903
Purchasing team products	5	0.879
Reading sports news	5	0.916
Sport-related behaviours overall	20	0.894

Source: own illustration based on survey results

All constructs followed a closed question type or statement design. To obtain personal information of the participants (e.g., age or gender), nominal scales were used. Only to gather data on the favourite club of the participant, an open question was provided.

3.4 Data Analysis

The data gathered was analysed using the statistical tool SPSS regarding descriptive statistics, relationships between the variables, and potential predictions to obtain a conclusive answer to the research. In addition, correlation and regression analyses were conducted to test the proposed hypotheses.

A correlation analysis was chosen since correlational studies define whether a relationship exists between two variables. Though, it does not imply whether one variable causes the other. The variables are interchangeable (Sekaran & Bougie, 2016, p. 44). As the data gathered displayed a non-normal distribution pattern the non-parametric correlation coefficient of Spearman was applied. In particular, the relationship between the usage of digital products and sport-related behaviour (Hypotheses 1a-e), the usage of digital products and satisfaction (Hypotheses 2a-e), as well as satisfaction and sport-related behaviour (Hypotheses 3a-e) was measured using Spearman's correlation coefficient.

To test the mediating role of satisfaction in the model, the approach of Baron & Kenny (1986) using regression analysis was considered, and accordingly, the following three steps needed to be considered:

1. A regression analysis of the dependent on the independent variable where the independent variable must predict the dependent variable,
2. a regression analysis of the mediator on the independent variable where the independent variable must predict the mediator, and

3. a regression analysis of the dependent variable on both the mediator and the independent variable where the mediator must predict the dependent variable.

Finally, to show full mediation, the effect of the independent on the dependent variable in step three must be zero (i.e., there is no more correlation between the independent and dependent variable). If it is not zero, but the effect of the independent on the dependent variable is reduced (compared to step two), partial mediation exists. If one step does not apply, the mediation analysis is terminated (Baron & Kenny, 1986). Besides, testing with regression analysis gives the readers insights into potential predictions between the variables described and discussed in the following chapters.

3.5 Validity, Reliability, and Objectivity

Throughout the research, special attention was given to considering quality criteria such as validity, reliability, and objectivity to ensure instrument fit, consistency, and fact-based findings of the research (Rammstedt, 2010, p. 239ff; Sekaran & Bougie, 2016, p. 21ff). This includes the sample, data collection, and questionnaire, as well as the data analysis and interpretation. The following aspects have been taken into account to comply with the above criteria.

Sample

For the sample, various characteristics were covered, and participants having favourite clubs in the 1st or 2nd Bundesliga were represented, emphasizing a high geographical coverage. Moreover, only individuals identifying as fans were addressed and included in the survey. Additionally, a sufficient number of units were approached to obtain conclusive results. According to the rule of thumb of Roscoe (1975, quoted in Sekaran & Bougie, 2016, p. 264), a sample size higher than 30 and less than 500 is appropriate.

Data collection and questionnaire

Regarding data collection, it was ensured that each unit was provided with the same questionnaire and had to answer the same questions. Also, to assume equal conditions among the participants when answering the survey, it was conducted over a short period of time. Generally, the questionnaires were filled out without any external influence (a precondition agreed on in the introduction of the online survey). As seen in subchapter 3.3, internal consistency of scales was provided as well. Apart from that, the principles of the wording were considered to ensure clarity among the participants about the statements.

Data analysis and interpretation

A potential relationship between usage, satisfaction, and behaviour is derived from other literature and their theory stressing the (potential) existence of the respective connection. Hence, the data analysis procedure was not randomly executed but rather carefully selected with the claim to be standardized when using the same data again. Additionally, the data analysis and the subsequent interpretation of the results in the discussion part were presented objectively by solely focusing on the gathered data, their results, and the respective literature. Therefore, emotional and subjective objections throughout the research were not justifiable.

4 Results

4.1 Descriptive Statistics

The three constructs and their descriptive statistics are displayed in three different tables to clarify the descriptive statistics of the different variables. As mentioned, the data is non-normal; accordingly, the arithmetic mean and standard deviation are unsuitable since extreme values may falsify the results. The median and the interquartile range (IQR) are more suitable and replace them (Sainani, 2012). Table 4 shows the descriptive results of the data on the usage of digital products in general, VR & AR, streaming, e-commerce, and online news services.

Table 4: Descriptive statistics of the usage of digital products

Variable (Usage of…)	**Min.**	**Max.**	**Median**	**Interquartile Range** (Upper minus lower quartile)
…digital products in general	1	6	5.2	5.8 - 4.6 = 1.2
…VR & AR	1	6	2.2	3 - 1.6 = 1.4
…of streaming	1	6	4.8	5.6 – 4.2 = 1.4
…e-commerce	1	6	4	4.8 - 3 = 1.8
…online news services	1	6	4.8	5.4 - 4 = 1.4

Source: own illustration based on survey results

While the smallest value to choose (Column 2) depicts the lowest usage, the highest possible value (Column 3) represents a high usage rate. The median shows that digital products, in general, are used a lot. The same applies to streaming and online news services, while VR & AR display the lowest usage on average. The IQR shows that the scatter of the middle half of the data, the variability, is similar for all variables.

The following table displays the descriptive results of the satisfaction of all the considered digital products and the satisfaction of digital products in general.

Table 5: Descriptive statistics of the satisfaction with digital products

Variable (Satisfaction with…)	**Min.**	**Max.**	**Median**	**Interquartile Range** (Upper minus lower quartile)
…digital products in general	1	6	4.5	5.25 - 4 = 1.25
…VR & AR	1	6	3	4 - 2 = 2
…streaming	1	6	4.75	5.5 – 4 = 1.5
…e-commerce	1	6	4.25	5 – 3.5 = 1.5
…online news services	1	6	4.5	5 – 3.75 = 1.25

Source: own illustration based on survey results

In this case, the smallest value to choose (Column 2) depicts the lowest possible satisfaction level, while the highest value (Column 3) represents a high satisfaction level. The median shows that the satisfaction level of digital products in general, streaming, e-commerce, and online news services is rather high compared to the satisfaction with VR & AR. The IQR shows similar results regarding variability from the median for each variable.

The following table portrays the descriptive results of the sport-related behaviours.

Table 6: Descriptive statistics of sport-related behaviours

Variable	**Min.**	**Max.**	**Median**	**Interquartile Range** (Upper minus lower quartile)
Sport-related behaviours overall*	1	6	4.3	4.8 – 3.8 = 1
Attending sporting events	1	6	4.2	5.2 – 3.2 = 2
Watching games	1	6	4.4	6 – 4.4 = 1.6
Purchasing team products	1	6	2.6	4 – 2.6 = 1.4
Reading sports news	1	6	4.2	5.6 – 4.2 = 1.4

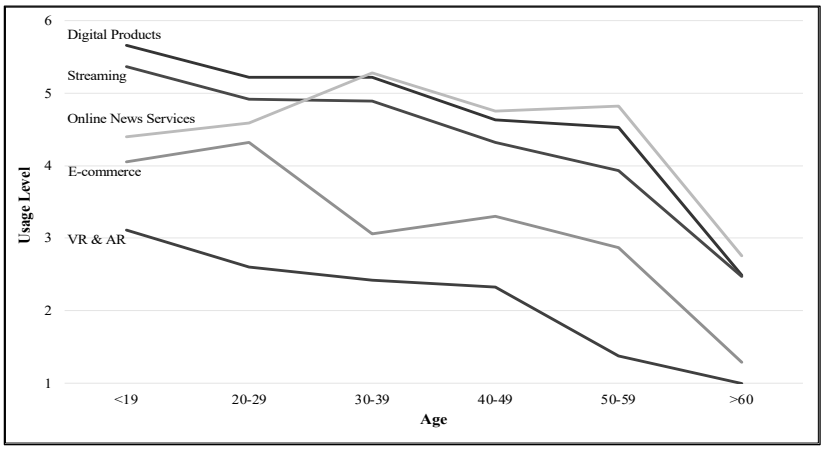
*derived from the average responses of the respective four sport-related behaviours

Source: own illustration based on survey results

The minimum value (Column 2) represents the lowest possible behavioural activity, while the maximum value (Column 3) displays the highest possible behavioural activity. The median shows that the behavioural extent is very similar across the sport-related behaviours, apart from purchasing team products showing a lower activity. Similar results can also be seen for the IQR.

Additionally, a downward-facing usage frequency can also be detected when considering the different age groups (Figure 8). The age group above 60 is less strongly presented in the study than the other age groups.

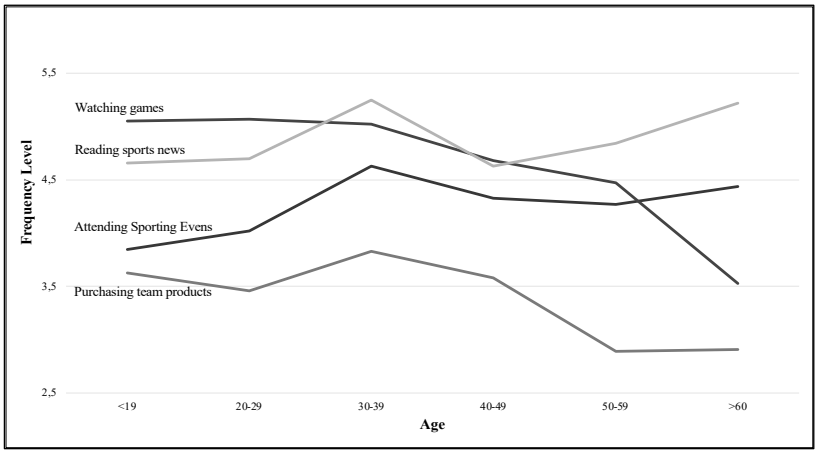
Figure 8: Usage of respective digital products regarding age



Source: own illustration based on survey data

For the usage of digital products in general and every other digital product, increasing age implies a decreasing usage frequency. The line depicting the usage of VR & AR indicates a lower rate compared to the others. The sport-related behaviours, on the other hand, show less significant trends (Figure 9).

Figure 9: Sport-related behaviours regarding age



Source: own illustration based on survey data

The average fan actively participates in sport-related activities, with no average below 2.5. The only abnormality to be seen is that watching games and purchasing team products show a slight decrease with increasing age, while this is the other way around for attending sporting events and reading sports news.

4.2 Correlational Analysis

To get an overview of whether the variables significantly correlate with each other and to address the hypotheses structurally, three tables are shown, each testing correlations between two constructs. Only the suggested correlations in the hypotheses are tested. Table 7 displays correlations between usage and behaviours.

Table 7: Correlation between usage and behaviour

	Sport-related behaviours overall	Attending sporting events	Watching games	Purchasing team products	Reading sports news
Usage of digital products in general	0.124				
Usage of VR & AR		-0.305**			
Usage of streaming			0.643**		
Usage of e-commerce				0.365**	
Usage of online news services					0.483**

All correlations were tested two tailed.
**p < .01

Source: own illustration based on survey results

The correlation analysis results show that the tested relationships are all statistically significant, except for the usage of digital products in general and sport-related behaviours overall. Accordingly, hypothesis 1a is not supported. Hypotheses 1b, c, d, and e suggest a positive relationship between the variables. Hence, hypotheses 1c, d, and e can be supported. Although the usage of VR & AR and attending sporting events present a significant relationship, it is negative – thus, hypothesis 1b is not supported. The next table shows the correlation results of the respective satisfaction variables on sport-related behaviour (Table 8).

Table 8: Correlation between usage and satisfaction

	Sat. with digital products in general	Sat. with VR & AR	Sat. with streaming	Sat. with e-commerce	Sat. with online news services
Usage of digital products in general	0.680**				
Usage of VR & AR		0.811**			
Usage of streaming			0.701**		
Usage of e-commerce				0.858**	
Usage of online news services					0.717**

All correlations were tested two tailed.
**p < .01

Source: own illustration based on survey results

This table shows statistically significant positive relationships between all usage and sport-related behaviour variables. Therefore, hypotheses 2a, b, c, d, and e are supported since they suggest a positive relationship between the variables. Table 9 displays the results of the correlations between satisfaction and sport-related behaviours.

Table 9: Correlation between satisfaction and behaviour

	Sport-related behaviours overall	Attending sporting events	Watching games	Purchasing team products	Reading sports news
Sat. with digital products in general	0.074				
Sat. with VR & AR		-0.281**			
Sat. with streaming			0.464**		
Sat. with e-commerce				0.322**	
Sat. with online news services					0.405**

All correlations were tested two tailed.
**p < .01

Source: own illustration based on survey results

Apart from the satisfaction with digital products in general and sport-related behaviours overall, where no significant relationship was found, all tested relationships are statistically significant. Consequently, hypothesis 3a is not supported. The other hypotheses, i.e., 3b, c, d, and e, suggest a positive relationship between the variables. Thus, hypotheses 3c, d, and e can be supported. Although satisfaction with VR & AR and attending sporting events present a significant relationship, it is negative and not positive – thus, hypothesis 3b is not supported.

A table summarizing the results of the tested hypotheses from 1a-e, 2a-e, and 3a-e can be found in Appendix II.

4.3 Mediation and Prediction Analysis

The four suggested mediation models (Hypotheses 4a-e) are tested by deploying the method of Baron & Kenny (1986) using linear and multiple regression analysis. Each step described in subchapter 3.4 is taken for each model to see whether mediation exists. To have a better overview, it is structured according to the respective hypotheses 4a-e and can be found in Appendix III. A table summarizing the results of the suggested hypotheses 4a-e can be found in Appendix IV. Although, the hypotheses 4a-e are not supported, conclusive information was found on the predictions, correlations and descriptive statistics which are further discussed in chapter 5.

5 Discussion

This thesis strived to shed light on the role of digital products in the behavioural environment of sports fans with further investigation on the integration of satisfaction in the theoretical model. More precisely, it was examined to what extent the sport-related behaviours of German professional soccer fans are influenced by their usage of digital products and their implied satisfaction with them.

First, the descriptive statistics have given insights into the research. Secondly, correlations between the several variables have been examined. In particular, the variables were tested for a positive relationship with each other on a level approach. In a last step, the variable satisfaction was tested to be a potential mediator on each respective level, considering predictions between the variables. While hypotheses 1c, d, and e are supported, 1a and b are not since the usage of digital products, in general, is not related to sports-related behaviours overall, and the usage of VR & AR did not show a positive relationship with attending sporting events, but a negative. However, all the suggested correlations between usage and satisfaction showed significant results, i.e., 2a, b, c, d, and e.

Regarding the relationship between satisfaction and behaviour, hypotheses 3c, d, and e, suggesting a positive correlation, were supported. However, the relationship between general satisfaction with digital products and sports-related behaviours did not show any significance, and the relationship between satisfaction with VR & AR and attending sporting events was significantly negative. Although the mediation analysis provided insightful results regarding the predictability of satisfaction with the respective digital products and the four sport-related behaviours, all hypotheses were rejected. Consequently, the mediation model was not supported.

5.1 Theoretical Implications

The results contribute to both the technology adoption and satisfaction literature and the behavioural literature by providing an intersection between theoretical and practical approaches in business and sports literature. However, this has been regarded as a relatively sparsely researched field.

Therefore, theoretical models from a business-related environment were considered and brought in connection with sports management theory. After having analysed the status quo of digitalization and the state of usage regarding digital products in the sports environment, focusing on the German professional soccer industry, the TAM by Davis (1985) was introduced

in order to clarify what the adoption of technologies entails for the German professional soccer industry since new digital products have been adopted over time and consequently integrated into the fans' sport-related engagement behaviours. The engagement behaviour model of Yoshida et al. (2014) was adapted with modern technologies that have undergone the processes described in the TAM and the ECT, which have been brought into the sports management context. In this work, the ECT is not only applied in the sports environment like it is partly in the work of Trail et al. (2003), but rather in a sports environment influenced by the usage of technological products. As this thesis focuses on sport-related behaviours, the hypotheses have been developed considering the business models, the TAM and ECT, the sport-related models, the PCM by Funk & James (2001), and the engagement behaviour model. The support of the respective variables and also the findings on the predictions are all derived from sport- and business-related theories together. This proves the contribution to the literature as this combination of theory and practice is sparsely researched. This research has contributed to the understanding of each model analysed, regardless of literary background, as it has been used to test the hypotheses developed.

5.2 Managerial Implications

This research gives insightful information for companies, clubs, and sports managers. The most significant finding regarding implications is the possibility of considering the fans' usage frequency and satisfaction with digital products to steer or influence their sport-related behavioural activities. Knowing which digital products are used to what extent creates the opportunity to address target groups more specifically. Also, in terms of age, groups shall be addressed differently. Especially the concepts of VR & AR have been discussed to be highly important in the future (S. Schmidt et al., 2019). Investments in VR & AR within stadiums may attract the younger generation, which uses these technologies more frequently than the older generations. The negative correlation between the usage of VR & AR is less a threat but more an opportunity to counteract and turn this correlation around by increasing the focus on VR & AR solutions. The other suggested correlations (except Hypothesis 1a), showing a positive relationship between usage and behaviour, give rise to clubs and companies to further integrate the respective digital products to intensify the fans' sport-related behaviours. Especially the more robust relationship between streaming and watching games indicates that streaming plays a crucial role in fan-club interaction and needs to be managed cautiously.

The usage of digital products is relevant not only for companies and clubs regarding the behavioural outcome of the fans but also in terms of their satisfaction. As Oliver (1980)

proposes in the ECT, usage is treated as a precursor of satisfaction. Therefore, managers must ensure continuing behaviour in using digital products by fans as this signifies satisfaction. Accordingly, clubs can steer fans' satisfaction level by considering the usage rates of the digital products the fans use to interact. A lack of usage may entail a low satisfaction level. In other words, the usage of digital products can partly predict the fan's satisfaction with the digital products. Also, in terms of sport-related behaviour, some variation in the sport-related behaviour is explained by the usage of digital products, thus creating another insightful information source for managers. Especially the usage of streaming is a significant predictor of the frequency of watching games. Moreover, it is insightful for managers to be aware that using digital products generally does not predict sport-related behaviour. Overall, different sport-related behaviours relate to different digital products. Therefore, particular attention must be paid when combining sport-related behaviour with a specific digital product. Besides, this research informs clubs that their fans are actively using the provided technology to interact with the game, sport, player, or club. A lack of adoption of innovative products, as described in the work of Plattfaut & Koch (2021), should not be reduced to the fear of non-acceptance by fans. Instead of blaming the lack of technology adoption on the supporters, the spectators should be analysed more thoroughly to see which digital products should continue to be integrated to maintain fan satisfaction and intensify the fans' sport-related activities.

All in one, the findings support clubs and companies in the sports industry to manage the fans' digital needs better and address their fans with the right digital products. Furthermore, to steer the satisfaction of the fans by considering the usage rate and ensuring the consistency of sport-related behaviours by offering various digital products to make the following up of the respective sport-related behaviours easier.

5.3 Limitations and Future Research

Despite the thoroughly developed methodology, several limitations occurred and must be further displayed. First, despite covering various characteristics, the non-probability approach, and the cross-sectional design of the data, limit the generalizability of this research and the possibility of drawing a definite conclusion on causality, as other variables may also predict the behaviour. Reasons for that are constraints such as limited resource capabilities. Still, this research tried to define and derive clear directions of the variables for potential predictions. Also, although fans from various clubs were reached and all age groups were covered, most respondents are fans of the Hamburger SV and range from age 20 to 29. Thus, future research on the sport-related behaviour of fans should be conducted with a more balanced

sample inside or outside of Germany. To entirely rely on causal statements, future research should be conducted in an environment where the independent variable is easier to control, and the population can be addressed with a probability approach. (Quasi-) experimental designs make it possible to solely test the effect of a group that does not use technology or also test a group that does use digital products, such as it is done in, e.g., drug experiments (Miller & Rosenstein, 2006). A longitudinal study examining sports behaviour before and after the introduction of digital products is also possible. However, it requires many resources and may not be economically viable.

Moreover, the construct around the usage consists of different digital products where VR & AR are regarded as one. Even though they are very closely related, the theoretical elaboration of this work has shown that the technologies have different applications and find themselves at different levels of development (Cipresso et al., 2018). Therefore, contrary to current literature, it might be interesting to consider the two technologies separately but still in one research and examine the difference in their effects on sport-related behaviours.

Furthermore, instead of testing the relationship or effect of usage and satisfaction on behaviour, the research model could be investigated conversely to examine the antecedents of sport-related behaviour (Melnick & Wann, 2011). The results of sport-related behaviour could then be compared to behaviours in other countries and cultures, like in the work of Parry et al. (2014).

6 Conclusion and Outlook

This thesis dealt with the question of whether the usage of digital products influences sport-related behaviours by considering the fans' satisfaction with digital products. To answer the question, the four sport-related behaviours have been updated regarding the current status quo of digitalization in the German professional soccer industry to "attending sporting events (physically and technology-assisted", "watching games (via TV or internet)", "purchasing team products (offline and online)", and "reading sports news (print and online)". By obtaining data through a survey, the respective sport-related behaviours were brought into context with the usage and satisfaction of digital products in general and additional digital products in particular. Results showed a positive relationship between the usage of streaming and watching games, the usage of e-commerce and purchasing team products, and the usage of online news services and reading sports news. On the other hand, a negative relationship between the usage of VR & AR and attending sporting events was found. Although satisfaction could not be confirmed as a mediator, the independent variables, to some extent, explain the variation in the dependent variable, i.e., sport-related behaviours, and are consequently useful as predictors. Furthermore, using the respective digital products can also predict satisfaction referring to the strong correlation between the variables. Based on these findings, it is concluded that the usage of digital products affects the fans' sport-related behaviours and, to some extent, serves as a predictor as well. This is helpful for managers and clubs to increase effectiveness when managing their fans' digital needs and to achieve consistency regarding fan satisfaction and their sport-related behaviours.

The role of digital products and innovative technologies play a crucial role today and will further in the future. Literature has shown that there exists potential to integrate innovative technologies, but risks are considered to be too high for now. The role of VR & AR, second screen devices, robotic process automation, AI, IoT, or non-fungible tokens in fantasy leagues will further disrupt sport-related behaviours where fans may be regarded as immersive participants of the game (Ante, 2021; Li et al., 2021; Lopez-Gonzalez et al., 2018; Plattfaut & Koch, 2021; Sturm, 2020). This, especially in combination with potential social disruptors, such as pandemics or wars, will play an influential role in the future.

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Appendix I: Questionnaire

Startfrage (weitere Teilnahme nur bei „Ja“)

Sind Sie Fan eines Vereins der 1. oder 2. Bundesliga?

☐ Ja ☐ Nein

1. Benutzung digitaler Produkte in der Freizeit

Generell digitale Produkte *Beispiele: Websites, Handy-Apps, Videospiele, Softwareservices etc.*	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Generell benutze ich digitale Produkte regelmäßig.	☐	☐	☐	☐	☐	☐
Das Benutzen von digitalen Produkten gehört zu meinen Tagesaktivitäten.	☐	☐	☐	☐	☐	☐
Ich würde es schade finden, wenn es keine digitalen Produkte geben würde.	☐	☐	☐	☐	☐	☐
Digitale Produkte nehmen einen großen Teil meiner Freizeit ein.	☐	☐	☐	☐	☐	☐
Zukünftig kann ich mir vorstellen digitale Produkte (noch) mehr zu nutzen.	☐	☐	☐	☐	☐	☐

Virtuelle (VR) und erweiterte Realität (AR) *Beispiele: YouTubeVR, PlaystationVR, Pokémon Go, Social Media Kamera Filter, Google AR etc.*	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Generell benutze ich VR und AR regelmäßig.	☐	☐	☐	☐	☐	☐
Das Benutzen von VR und AR gehört zu meinen Tagesaktivitäten.	☐	☐	☐	☐	☐	☐
Ich würde es schade finden, wenn es kein VR und AR geben würde.	☐	☐	☐	☐	☐	☐
VR und AR nehmen einen großen Teil meiner Freizeit ein.	☐	☐	☐	☐	☐	☐
Zukünftig kann ich mir vorstellen VR und AR (noch) mehr zu nutzen.	☐	☐	☐	☐	☐	☐

Visuelles Streaming *Beispiele: Netflix, Amazon Prime, DAZN, SKY, RTL+, Online Mediatheken, Club TV/Stream etc.*	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Generell benutze ich visuelles Streaming regelmäßig.	☐	☐	☐	☐	☐	☐
Das Benutzen von visuellem Streaming gehört zu meinen Tagesaktivitäten.	☐	☐	☐	☐	☐	☐
Ich würde es schade finden, wenn es kein visuelles Streaming geben würde.	☐	☐	☐	☐	☐	☐
Visuelles Streaming nimmt einen großen Teil meiner Freizeit ein.	☐	☐	☐	☐	☐	☐
Zukünftig kann ich mir vorstellen visuelles Streaming (noch) mehr zu nutzen.	☐	☐	☐	☐	☐	☐

E-Commerce/Onlineshopping *Beispiele: Amazon, Otto, Ebay, Zalando, Lieferando, Flink, Gorillas, Media Markt etc.*	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Generell benutze ich E-Commerce regelmäßig.	☐	☐	☐	☐	☐	☐
Das Benutzen von E-Commerce gehört zu meinen Tagesaktivitäten.	☐	☐	☐	☐	☐	☐
Ich würde es schade finden, wenn es kein E-Commerce geben würde.	☐	☐	☐	☐	☐	☐
E-Commerce nimmt einen großen Teil meiner Freizeit ein.	☐	☐	☐	☐	☐	☐
Zukünftig kann ich mir vorstellen E-Commerce (noch) mehr zu nutzen.	☐	☐	☐	☐	☐	☐

Online-Nachrichtendienste *Beispiele: Bild.de, Spiegel Online, n-tv.de, Focus Online, Zeit Online, Social Media etc.*	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Generell benutze ich Online-Nachrichtendienste regelmäßig.	☐	☐	☐	☐	☐	☐
Das Benutzen von Online-Nachrichtendiensten gehört zu meinen Tagesaktivitäten.	☐	☐	☐	☐	☐	☐
Ich würde es schade finden, wenn es keine Online-Nachrichtendienste geben würde.	☐	☐	☐	☐	☐	☐
Online-Nachrichtendienste nehmen einen großen Teil meiner Freizeit ein.	☐	☐	☐	☐	☐	☐
Zukünftig kann ich mir vorstellen Online Nachrichtendienste (noch) mehr zu nutzen.	☐	☐	☐	☐	☐	☐

2. Zufriedenheit mit digitalen Produkten

Generell digitale Produkte	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Meine allgemeine Erfahrung mit digitalen Produkten beurteile ich als…						
…sehr zufriedenstellend.	☐	☐	☐	☐	☐	☐
…sehr ansprechend.	☐	☐	☐	☐	☐	☐
…sehr befriedigend.	☐	☐	☐	☐	☐	☐
…sehr erfreuend.	☐	☐	☐	☐	☐	☐

Virtuelle (VR) und erweiterte Realität (AR)	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Meine allgemeine Erfahrung mit VR und AR beurteile ich als…						
…sehr zufriedenstellend.	☐	☐	☐	☐	☐	☐
…sehr ansprechend.	☐	☐	☐	☐	☐	☐
…sehr befriedigend.	☐	☐	☐	☐	☐	☐
…sehr erfreuend.	☐	☐	☐	☐	☐	☐

Visuelles Streaming	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Meine allgemeine Erfahrung mit visuellem Streaming beurteile ich als…						
…sehr zufriedenstellend.	☐	☐	☐	☐	☐	☐
…sehr ansprechend.	☐	☐	☐	☐	☐	☐
…sehr befriedigend.	☐	☐	☐	☐	☐	☐
…sehr erfreuend.	☐	☐	☐	☐	☐	☐

E-Commerce/Onlineshopping	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Meine allgemeine Erfahrung mit E-Commerce beurteile ich als…						
…sehr zufriedenstellend.	☐	☐	☐	☐	☐	☐
…sehr ansprechend.	☐	☐	☐	☐	☐	☐
…sehr befriedigend.	☐	☐	☐	☐	☐	☐
…sehr erfreuend.	☐	☐	☐	☐	☐	☐

Online-Nachrichtendienste	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Meine allgemeine Erfahrung mit Online-Nachrichtendiensten beurteile ich als…						
…sehr zufriedenstellend.	☐	☐	☐	☐	☐	☐
…sehr ansprechend.	☐	☐	☐	☐	☐	☐
…sehr befriedigend.	☐	☐	☐	☐	☐	☐
…sehr erfreuend.	☐	☐	☐	☐	☐	☐

3. Sportbezogenes Verhalten

Teilnahme an Sportevents im Fußball *Beispiele: Stadionbesuche, öffentliche Trainings, Fanclub Meetings, (online) Pressekonferenzen etc.*	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Ich nehme regelmäßig an Sport Events teil.	☐	☐	☐	☐	☐	☐
Die Teilnahme an Sportevents ist fester Bestandteil meiner Aktivitäten.	☐	☐	☐	☐	☐	☐
Die Teilnahme an Sportevents ist mir wichtig.	☐	☐	☐	☐	☐	☐
Ich würde es schade finden, wenn die Teilnahme an Sport Events nicht möglich wäre.	☐	☐	☐	☐	☐	☐
Wie häufig ich an Sport Events teilnehme, wird sich zukünftig nicht ändern.	☐	☐	☐	☐	☐	☐

Fußballspiele im TV oder via Stream verfolgen *Beispiele: Sky, DAZN, Amazon Prime, RTL+, Free-TV Sender etc.*	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Ich verfolge regelmäßig Spiele via TV/Stream.	☐	☐	☐	☐	☐	☐
Das Verfolgen von Spielen via TV/Stream ist fester Bestandteil meiner Aktivitäten.	☐	☐	☐	☐	☐	☐
Das Verfolgen von Spielen via TV/Stream ist mir wichtig.	☐	☐	☐	☐	☐	☐
Ich würde es schade finden, wenn die Verfolgung von Spielen via TV/Stream nicht möglich wäre.	☐	☐	☐	☐	☐	☐
Wie häufig ich Spiele via TV/Stream verfolge, wird sich zukünftig nicht ändern.	☐	☐	☐	☐	☐	☐

Teamprodukte/Fanartikel kaufen *Beispiele: Fan Shop, Onlineshop, Stadionstand etc.*	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Ich kaufe regelmäßig Fanartikel (z.B. jährlich zum Saisonstart).	☐	☐	☐	☐	☐	☐
Das Kaufen von Fanartikeln ist fester Bestandteil meiner Aktivitäten.	☐	☐	☐	☐	☐	☐
Das Kaufen von Fanartikeln ist mir wichtig.	☐	☐	☐	☐	☐	☐
Ich würde es schade finden, wenn das Kaufen von Fanartikeln nicht möglich wäre.	☐	☐	☐	☐	☐	☐
Wie häufig ich Fanartikel kaufe, wird sich zukünftig nicht ändern.	☐	☐	☐	☐	☐	☐

Lesen von Sportnachrichten im Fußball *Beispiele: Magazine, Zeitungen, Social Media, Nachrichten Apps, Clubwebsites*	Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme vollkommen zu
Ich lese regelmäßig Sportnachrichten.	☐	☐	☐	☐	☐	☐
Das Lesen von Sportnachrichten ist fester Bestandteil meiner Aktivitäten.	☐	☐	☐	☐	☐	☐
Das Lesen von Sportnachrichten ist mir wichtig.	☐	☐	☐	☐	☐	☐
Ich würde es schade finden, wenn das Lesen von Sportnachrichten nicht möglich wäre.	☐	☐	☐	☐	☐	☐
Wie häufig ich Sportnachrichten lese, wird sich zukünftig nicht ändern.	☐	☐	☐	☐	☐	☐

Allgemein

Welchem Geschlecht fühlen Sie sich zugehörig?

☐ männlich ☐ weiblich ☐ divers ☐ ohne Angabe

Zu welcher der nachfolgenden Alterskategorien gehören Sie?

☐ 19 oder jünger ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60 oder älter

Was ist Ihr höchster Schul- oder Hochschulabschluss?

☐ Schulabschluss ☐ Berufsausbildung ☐ Studium ☐ Anderes ☐ ohne Angabe

Welche der folgenden Kategorien beschreibt Ihren Beschäftigungsstatus am besten?

☐ ohne Beschäftigung ☐ Auszubildende(r) oder Student(in) ☐ angestellt

☐ selbstständig ☐ pensioniert ☐ ohne Angabe

Was ist Ihr Lieblingsverein (1. und 2. Bundesliga)? _____

Appendix II: Hypotheses overview 1-3

Hypothesis	
1a: The usage of digital products in general will be positively related to sport-related behaviours overall.	rejected
1b: The usage of VR & AR will be positively related to attending sporting events (physically or technology-assisted).	rejected
1c: The usage of streaming will be positively related to watching games (via TV or internet).	supported
1d: The usage of e-commerce will be positively related to purchasing team products (offline or online).	supported
1e: The usage of online news services will be positively related to reading sports news (print and online).	supported
2a: The usage of digital products in general will be positively related to satisfaction with them.	supported
2b: The usage of VR & AR will be positively related to satisfaction with them.	supported
2c: The usage of streaming will be positively related to satisfaction with it.	supported
2d: The usage of e-commerce will be positively related to satisfaction with it.	supported
2e: The usage of online news services will be positively related to satisfaction with them.	supported
3a: The satisfaction with digital products in general will be positively related to sport-related behaviours overall.	rejected
3b: The satisfaction with VR & AR will be positively related to attending sporting events (physically or technology-assisted).	rejected
3c: The satisfaction with streaming will be positively related to watching games (via TV or internet).	supported
3d: The satisfaction with e-commerce will be positively related to purchasing team products (offline or online).	supported
3e: The satisfaction with online news services will be positively related to reading sports news (print and online).	supported

Source: own illustration

Appendix III: Mediation and Prediction Analysis

Hypothesis 4a: The relationship between the general usage of digital products and sport-related behaviours overall is mediated through satisfaction.

Step 1: The first step cannot be fulfilled since a change in sport-related behaviour overall cannot be significantly predicted with the usage of digital products in general ($p = 0.095 > 0.05$). Therefore, hypothesis 4a is not supported.

Hypothesis 4b: The relationship between the usage of VR & AR and attending sporting events (physically or technology-assisted) is mediated through satisfaction.

Step 1: The first step is fulfilled as a change in attending sporting events can be predicted by the usage of VR & AR ($p = 0.001 < 0.05$) with the regression equation being: *Attending sporting events = –0.334 ∗ Usage of VR & AR + 4.935*. The result range of the equation is from 1 (low attendance) to 6 (high attendance). Due to the rather low to moderate correlation, only 10.2% of the variation in the dependent variable can be explained by the independent variable (R^2).

Step 2: This regression analysis indicates that satisfaction with VR & AR can be predicted through the usage of it ($p = 0.001 < 0.05$). The regression analysis, in which the output ranges from 1 (low satisfaction) to 6 (high satisfaction), is as followed: *Satisfaction with VR & AR = 0.977 ∗ Usage of VR & AR + 0.595*. The independent variable explains 68.9% of the variation in the dependent variable (R^2).

Step 3: In this step, the mediator is supposed to have a significant effect on the dependent variable while the independent variable shows no or a reduced effect. The multiple regression shows that usage has an effect ($p = 0.041 < 0.05$) and the mediator satisfaction does not ($p = 0.674 > 0.05$). Hypothesis 4b is not supported since satisfaction needs to be significant.

Hypothesis 4c: The relationship between the usage of streaming and watching games (via TV or internet) is mediated through satisfaction.

Step 1: With the regression equation – *Watching games = 0.639 ∗ Usage of streaming + 1.901* – the dependent variable can be significantly predicted from the usage of streaming ($p = 0.001 < 0.05$), where the output varies from 1 (low frequency watching games) to 6 (high frequency watching games). 44.7% of the variation in the dependent variable is explained by the independent variable (R^2).

Step 2: The results show that the usage of streaming significantly predicts satisfaction with streaming ($p = 0.001 < 0.05$) and that 52.5% of the variation in the dependent variable is explained by the dependent variable (R^2). Satisfaction with streaming is predicted with the following regression equation: *Satisfaction with streaming = 0.782 ∗ Usage of streaming + 0.910*, where the output ranges from 1 (low satisfaction) to 6 (high satisfaction).

Step 3: The multiple regression shows that the usage of streaming still significantly predicts the frequency of watching games when controlling for satisfaction ($p = 0.001 < 0.05$), but satisfaction with streaming does not show any effect ($p = 0.777 > 0.05$). No mediation is supported since the results would need to be the other way around. Thus, hypothesis 4c is rejected.

Hypothesis 4d: The relationship between the usage of e-commerce and purchasing team products (offline or online) is mediated through satisfaction.

Step 1: Usage of e-commerce predicts the purchase of team products ($p = 0.001 < 0.05$) with the following equation: *Purchasing team products = 0.289 ∗ Usage of e-commerce + 2.327*, in which results vary from 1 (low frequency of purchasing team products) to 6 (high frequency of purchasing team products). Because of a rather low to moderate correlation, 11.8% of the variation in the dependent variable is explained by the usage of e-commerce (R^2).

Step 2: Also, satisfaction with e-commerce is significantly predictable from the usage ($p = 0.001 < 0.05$). The regression equation is as followed: *Satisfaction with e-commerce = 0.857 ∗ Usage of e-commerce + 0.856*, where the output ranges from 1 (low satisfaction) to 6 (high satisfaction). The variation in the dependent variable is explained by 75.4% from the usage of e-commerce (R^2).

Step 3: Also in this case the results of the multiple regression do not underline a mediation model since the independent variable, the usage of e-commerce, remains significant ($p = 0.006 < 0.05$) while the mediator, satisfaction with e-commerce, is insignificant ($p = 0.594 > 0.05$). Thus, hypothesis 4d is not supported.

Hypothesis 4e: The relationship between the usage of online news services and reading sports news (print and online) is mediated through satisfaction.

Step 1: The regression equation, *Reading sports news = 0.379 ∗ Usage of online news services + 3.045*, significantly predicts the dependent variable ($p = 0.001 < 0.05$), where results range from 1 (low frequency of reading sports news) to 6 (high frequency of reading sports

news). Besides, 19.1% of the variation in the dependent variable is explained by the usage of online news services (R^2).

Step 2: The usage of e-commerce significantly predicts satisfaction with e-commerce ($p = 0.001 < 0.05$). The prediction can be calculated with the following regression equation: *Satisfaction with e-commerce = 0.782 ∗ Usage of e-commerce + 0.787*, in which the output varies from 1 (low satisfaction) to 6 (high satisfaction). Moreover, 62% of the variation in the dependent variable is explained by the independent variable (R^2).

Step 3: The multiple regression shows that the usage of e-commerce remains a significant predictor ($p = 0.001 < 0.05$) while the mediator, satisfaction with e-commerce, is no more a significant predictor ($p = 0.487 > 0.05$). That is why hypothesis 4e is rejected as well.

Appendix IV: Hypotheses overview 4a-e

Hypothesis	
4a: The relationship between the usage of digital products in general and sport-related behaviours overall is mediated through satisfaction.	rejected
4b: The relationship between the usage of VR & AR and attending sporting events (physically or technology-assisted) is mediated through satisfaction.	rejected
4c: The relationship between the usage of streaming and watching games (via TV or internet) is mediated through satisfaction.	rejected
4d: The relationship between the usage of e-commerce and purchasing team products (offline or online) is mediated through satisfaction.	rejected
4e: The relationship between the usage of online news services and reading sports news (print and online) is mediated through satisfaction.	rejected

Source: own illustration