

Technology Enhanced Sports Spectators Customer Experiences: Measuring and Identifying Impact of Mobile Applications on Sports Spectators Customer Experiences

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The present study aims to investigate the effect of mobile applications (apps) implementation and employment on spectators customer experiences (SSCX). This research provides a conceptual framework for studying the effects of technologies (smartphones, apps, etc.) on sports spectator experiences, with the intention of future research at the intersection of these two topics. It delineates usage of technologies as a multidimensional construct and proposes that technologies affect consumer psychology and experience through different dimensions—cognitive, emotional, behavioural, sensorial, and social responses (Lemon and Verhoef 2016). With this conceptual framework and research agenda, it challenges us to ask deeper questions about why technological affiliation and level of technology using involvement may be driving previously established differences in consumer experiences, and to uncover the psychological mechanisms underlying the effects. This framework complements and extends previous literature and provides a new delineated framework for considering research on the effects of technologies on CX. We have confirmed that usage of mobile apps may impact on SSCX through social, cognitive and behavioural responses.

Keywords: sports spectacle, mobile application, customer experience, smartphone, technology, fan experience

Introduction

Mobile applications became an essential part of sports spectating culture, enhancing and making more comfortable fan experiences, functioning for all the stakeholders (Glebova et al. 2020a, Glebova and Desfontaine 2020).

The present study aims to investigate the effect of mobile applications (apps) implementation and employment on sports spectators customer experiences (SSCX). This research provides a conceptual framework for studying the effects of new technologies on sports spectator experiences (Desbordes et al. 2019), with the intention of future research at the intersection of these two topics. It delineates usage of technologies as a multidimensional construct and proposes that new technologies affect consumer psychology (King and Dong 2017) and experience

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(Klaus and Maklan 2012) through different dimensions— cognitive, emotional, behavioral, sensorial, and social responses (Lemon and Verhoef 2016).

With this conceptual framework and research agenda, it challenges us to ask deeper questions about why technological affiliation and level of technology using involvement may be driving previously established differences in consumer experiences, and to uncover the psychological mechanisms underlying the effects. This framework complements and extends previous literature and provides a new delineated framework for considering research on the effects of technologies on CX.

Theoretical Background

Despite technological development and sports digitalization trends, research on sports digitalization in the International Sports discipline is surprisingly still nascent. Mobile apps are especially interesting nowadays (Kojo et al. 2014), because they embrace and consolidate in a single interface many opportunities of emerging technologies, such as Internet of things (IoT) (Marek and Wozniczka 2017), Social Media, Immersive technologies (XR) and many more (Vikström and Zheng 2013, Giblin and Parrington 2016, Ritchy 2017, Glebova and Desfontaine 2020).

Wang et al. (2012, 2016) study results show that the different uses of smartphones in everyday living are associated with different perceptions toward the capability of smartphones and, in turn, how travelers communicate, consume information consumption, and use their time.

Because of the large array of technological innovations and tools available to fans, brands, coaches and sports performers, this choice, paired with the increased desire to collect and process information rapidly and at minimum cost to the user, may increase the chances of selecting the fad option, rather than an appropriate tool. A number of technologies in sport reviews have previously been published (e.g., Uematsu and Saito 2008, Cummins et al. 2013, McCarthy 2013, Wilson 2013, Morosan and DeFranco 2016, Mejova and Kalimeri 2019).

There is a tendency towards growth of technologically highly sophisticated products (Glebova and Brasier 2020), resulting in fundamental transformations in the interaction of the company with the customer (Table 1). This indicates the need for a broad study since academic research into the readiness of people to use such systems is still considered to be at early stage (Parasuraman 2000).

Accordingly, technological changes can significantly alter consumers' way of life (Pires et al. 2011, Chang et al. 2016). Mick and Fournier (1998) tested and noticed that technology instead of always being positive is often paradoxical. At the same time as it generates positive feelings of control, freedom, novelty, competence, efficiency, satisfaction, association and engagement, it may also provoke feelings of chaos, enslavement, obsolescence, incompetence, inefficiency, dissatisfaction, isolation and disengagement.

Recent academic researchers are focused mostly on intersection of technologies and sports performance and exercising (Ratten 2018), but the understanding of

impact of technologies (and technological use as a complex factor) on the CX of sports fans and spectators remains unclear.

However, there are a large number of academic works regarding CX and Spectators experiences, which are the strong theoretical foundation for the current research (Gentile et al. 2007, Gilmore and Pine 2002, Buccini and Padovani 2007, Bodet, 2008, Verhoef et al. 2009, Bouchet 2011, Chavanat and Bodet 2014, Theodorakis 2014, Biscaia 2018, Lemon and Verhoef 2016, Kemppainen 2018, Zaki and Neely 2018, Glebova and Desfontaine 2020).

Table 1. *Technology Usage (TU) Positive and Negative Sides of Impact and Proposed Dimensions*

Dimension	TU Positive Impact	TU Negative Impact
TAM (Davis 1989, Parasuraman and Colby 2001)	Optimism innovativeness	Discomfort insecurity
Emotional (Lemon and Verhoef 2016)	Joy and fulfillment	Emotional instability (Roberts et al. 2015) Depression, anxiety, low self-esteem and stress (SIS)
Social (Lemon and Verhoef, 2016, Roberts and David 2016)	Social support (Wann and Melnick 2001)	Loneliness, social escape, social anxiety
Perceived usefulness, sensorial	Information support, basic needs satisfaction	Distraction, aggravating the memory, vision, headaches
Satisfaction (Roberts et al. 2015, Roberts and David, 2016)	Satisfaction (Morgan and Rego 2006)	Dissatisfaction (Kim et al. 2019)
Cognitive (Lemon and Verhoef 2016)	Usefulness in terms of information access and analysis	Aggravation of concentration of attention
Psychological (Lemon and Verhoef 2016), addiction-orientated (Pancani et al. 2019, Riva 2016)	Optimization of resources	Anthropomorphism, physical inactivity, lack of physical activity, behavioral (technological) addiction (adopted from SIS, Kim et al. 2014)

Although positive perceptions toward technology use leads to positive behavioral outcomes (Morosan and DeFranco 2016), research has determined cases when use of technology may increase technology anxiety, in turn leading to customer dissatisfaction (Liu 2012, Lee and Baker 2017).

Technologies are so attractive for positive, societal change, but also generate an environment for potential concern (Nichols 2017). While such technologies have been widely adopted in training scenarios, understanding the limitations regarding their effective use is paramount (Chandy and Tellis 1998).

Inversini and Schegg (2016) proposes five activity categories relevant for mapping the consumption journey of a sport event, namely, “sensing”, “linking”, “performing”, “organizing”, and “navigating”. These five activity categories extend the work of Korn and Pine (2011) and Gretzel and Fesenmaier (2003). In their typology of human capability, Korn and Pine (2011) theorize present-day consumers, as individuals and in groups, employ mobile technology to fulfil two primary purposes: connecting; and doing. Individuals and groups connect by sensing and linking respectively; they manipulate their surrounding environments by performing and organizing (Inversini and Schegg 2016).

Important to note, that in current study we use terms “smartphone”, “mobile phone”, “technology” interchangeably as synonyms, adding to this list “mobile apps”, because mobile apps cannot be used separately from screen device such as smartphone, laptop, tablet, etc. Furthermore, mobile apps may include additional accessories, such as wearable technologies.

Design/Methodology/Approach

This study draws on literatures spanning from technology, CX, Sports Spectacle, Technologies Innovations, Psychology and combine them with data collection and analysis in the spirit of grounded theory. The outcome is a new conceptual framework on impact of mobile apps and related technologies on sports spectacle and their influences on emotional and other reactions. It discusses the findings in terms of implications for theories of Spectator experiences and journey, technology, an expanded role for the mobile apps construct in consumer research, specializing in sports spectacle.

The data gathering tools are interviews (N=20) and questionnaires (N=100) including key items measuring general factors of SSCX and mobile applications.

Expected Implications

The research results provide benefits for all organizations in the sports industry, sports-related brands, event organizations, researchers and customers as well.

Spectator ways to experience are heterogeneous, moreover with the today technological advancements opportunities. Therefore, club managers need to know and understand their spectators to better adjust deployment and implementation of mobile apps (Davenport et al. 2019).

Furthermore, possessing of knowledge enables managers to keep a track of various types of technologies they have planned, introduced and implemented, make better decisions in the area of resource allocation and enhance SSCX and Customer Journey (Glebova et al. 2020b).

Research Design

Case studies are used to test hypotheses. The purpose is to understand how or why using technologies impact on SSCX. It let us to assess the conditions surrounding a phenomenon to build a plausible explanation or to discover a causal relationship that links the antecedents to the results. The synthesis of literature has led us to formulate following hypotheses.

The main Hypothesis: Usage of emerging technologies affects SSCX through different dimensions— cognitive, emotional, behavioral, sensorial, and social responses (Lemon and Verhoef 2016).

Pittman (2017) in his study attempted to answer a simple question: in terms of emotional well-being, are social media (and other apps) good? The overall findings of this research offer a simple answer: “yes”. Considering the fact, that emotional aspect is essential in sports fandom, we formulate hypothesizes regarding anxiety (Liu 2012, Lee and Baker 2017) and feeling nervous, emotionally instable (Roberts et al. 2015) using smartphones in SSCX.

H.1. Emotional

H1.1. Usage of apps in SSCX increases anxiety

H1.2. Active apps users in SSCX feel nervous

H2. Social

From a social perspective, recent studies have shown that loneliness and social anxiety are positively related to smartphone addiction (Bian and Leung 2015, Darcin et al. 2016). This phenomenon aligns with the study by Kim (2017), who found that lonely individuals tend to rely more on apps-mediated communication than face-to-face real interactions to alleviate their loneliness (Pancani et al. 2019).

Definitely, nowadays technology let people stay connected, including fans. Mobile apps, functioning for all the stakeholders, are a powerful fan engagement tool as well (Wagner and Dixon 2016). Users usually appreciate this fact (Wang et al. 2016), but do fans think they are better socially engaged and socially supported in grace of technology?

H2.1. Sports spectators feel socially engaged and supported in grace of technologies

However, a few studies indicate that using smartphone and apps often leads users to feeling of loneliness (Gezgin et al. 2018), even naming this phenomenon “Phoneliness” (Pittman 2017).

H2.2. Active users of apps in SSCX feel loneliness

H3. Sensorial

Extending SIS model suggestions (Pancani et al. 2019) and noted physiological impact on technologies users (Bian et al. 2016), we test hypothesizes that using of smartphone and apps may cause problems with vision or headaches.

H3.1. Active users of apps in SSCX notice problems with vision abilities

Prolonged smartphone sessions can provoke musculoskeletal damage, including back and neck pain (Kim and Kim 2015, Kim et al. 2013, Pancani et al. 2019).

H3.2. Active users of apps in SSCX notice problems with headaches

H4. Cognitive

Campos et al. (2016) have simply explained the relationship between attention and memory, and it was widely discussed in cognitive psychology and neuroscience. Attention influences memory, and memory, in turn, influences attention (Chun and Turk-Browne 2007, Kuhl and Chun 2014). Indeed, researchers consider that attention and memory are interdependent systems since recollection is itself a form of attention, in as much as memory involves internally oriented attention. Moreover, active mental engagement incorporates strategic distribution of attention and, consequently, greater probability of successful recollection (Kuhl and Chun 2014).

Memory is limited in capacity (Kuhl and Chun 2014), imposing constraints on attentional processes (Robinson 2001). Memory depends on externally oriented attention even if attentive behavior is not related to explicit motivation to form long term memories (Kuhl and Chun 2014). Simplifying, attention is a step towards memory (Mancas and Le Meur 2013, Chun and Turk-Browne 2007, Pancani et al. 2019); from a cognitive perspective, highlighting the positive and negative consequences of para-social relationships that might arise from such a phenomenon (Pancani et al. 2019).

H4.1. Active users of apps in SSCX notice memories aggravation about the match/game details

Pancani et al. (2019) notices that smartphones are a primary driving distraction, and the most recent estimates indicate that these devices cause at least 1 of every 4 accidents on US streets. Furthermore, smartphone addiction was found to negatively affect academic performance (Hawi and Samaha 2017).

H4.2. Active users of apps in SSCX are less concentrated (concentration of attention) on the game/match

The use of smartphone to overcome negative inner states can be interpreted as a distraction strategy that can have the positive effect to free the mind from the source of negative feelings, preventing the use of more dysfunctional strategies, such as rumination (Riva 2016). Thus, the construct underlying Emotion regulation through technologies usage might represent a good coping strategy to improve current mood, though future studies are needed to assess its effectiveness (Pancani et al. 2019).

- H4.3. Active apps users lose focus on game/match sports content (distraction)
- H5. Behavioral

The literature has well documented how people are prone to anthropomorphize, i.e., ascribe humanlike characteristics, nonhuman agents (Epley et al. 2008, Pancani et al. 2019)

- H5.1. Active users of technologies in SSCX are addicted to anthropomorphize technological devices

Functioning for all the stakeholders, and being the marketing tool (Glebova et al. 2020a) apps may “push” in different manner fans to consume additional service, and encourage to change consumption habits (Wang et al. 2016, Schut and Glebova 2020).

- H5.2. Active users of apps in SSCX consume more “sports fans additional services”

Methodology

The data gathering tools are interviews and questionnaires including key items measuring general factors of CX and technologies advances. Data collection embraces 3 main studies: (1) survey for sports fans, using Survey Monkey software (N=100), quantitate and qualitative measuring of impact on SSCX of using and implementing emerging technologies (2) Qualitative interviews (N=10) with sport fans deeper investigating the impact of technologies on SSCX (3) Interviews (N=10) with professional managers in sports industry.

Results, contributions, case studies will be synthesized in order to conceptualize the framework.

We are investigating issues in global context, without any attachment to a particular place, organization or event. SSCX become more complex and inclusive, that’s why we understand technologies and CX as entire and undividable concepts. Samples for studies 1 and 2 are chosen broadly from sports fan groups in social media. A sample for study 3 is defined by an expertise, knowledge and experience in the field of implementation emerging technologies if SSCX (especially positions in sports clubs relating to technological transformation, digital transformation and innovations). For testing hypothesizes, we consolidate, analyses and rate collected data from interviews against each hypothesis, evaluating it from 0 (disagree) to 5 (absolutely agree), results can be found in Table 2 in discussion section.

Current study focuses on sport spectators in terms of using and implementation different types of mobile apps in their customer experiences.

Results and Discussion

Taking into account the global context, where absolute majority of people use smartphones and apps, including SSCX, we can consider them as active apps users. However, according to the questionnaire answers, about 2% do not use apps in their SSCX, but this fact does not change landscape of this study in general.

We have collected questionnaire answers from volunteers around the world, 61.22% men, 35.71% women and 3.06% not specified gender (Q1), following age groups (Table 2):

Table 2. *Age of Participants*

(1) below 18	4.00%
(2) 19-25	18.00%
(3) 26-34	30.00%
(4) 35-46	21.00%
(5) 47-55	18.00%
(6) 56-65	8.00%
(7) 65 and elder	1.00%

Source: Questionnaire, Q2 Answers.

There are three main purposes for using smartphone in SSCX (Table 3): doing/playing sports or measure performance (73%), make payments or buy things (51%), and the highest percent of mobile apps users watch sports (88%).

Table 3. *Do you Use your Smartphone for Sports Experiences?*

(1) No, never	2.00%
(2) Yes, I use it for doing/playing sports or measure sports performance	73.00%
(3) Yes, I use it for watching sports	88.00%
(4) I make payments or buy things	51.00%
(5) Other	6.00%
(6) I don 't know	2.00%

Source: Questionnaire, Q3 Answers.

The Q4 is mainly focused on identifying of using the second and multiple screens in SSCX. We can see that definitely spectators use smartphone during SSCX, especially for getting information concerning sports (76%) or buy tickets, order food, book hotel (50%). 37% use social media during SSCX, 29% make payments and 25 % do shopping (Table 4).

Table 4. Do you Use Smartphone of Tablet during Sport Spectating?

I don't use it (1)	2.00%
I use it to get information about sports (2)	76.00%
I buy tickets/ order food/ book hotel (3)	50.00%
I make payments (4)	29.00%
I do shopping (5)	25.00%
I communicate about sports (6)	28.00%
I communicate on various topics (7)	27.00%
I use social media (8)	37.00%
I make pictures (9)	43.00%
I post in social media (10)	34.00%
I don't know (11)	2.00%
Other (12)	1.00%

Source: Questionnaire, Q4 Answers.

Table 5 demonstrates key mobile apps employed by fans in SSCX. The Facebook is leading (74.75%) but it could be explained by the fact that we searched volunteers for questionnaire in Facebook sports fan communities.

70.71% of spectators use official applications of clubs and events they are interested in. The number of apps has been increased last years and almost any event and organization today have an own app, enhancing SSCX and functioning for all the stakeholders.

Instagram (59.60%) is popular in many terms, including SSCX, we suggest, in many cases for the second screen role.

MCN Sports (56.57%) and ESPN (53.54%) seem to have a strong recognition rate among sports spectators.

Table 5. What Mobile Apps are you Using in your SSCX?

ESPN (1)	53.54%
Facebook (2)	74.75%
Instagram (3)	59.60%
Official applications of clubs or events you are interested in (4)	70.71%
CBS Sports (5)	13.13%
CBScore (6)	8.08%
Yahoo Sports (7)	49.49%
Bleacher report (8)	20.20%
theScore (9)	9.09%
365Reports (10)	22.22%
MCN Sports (11)	56.57%
I don't know (12)	15.15%
Other (please precise) (13)	9.09%

Source: Questionnaire, Q5 Answers.

The most of all fans appreciate opportunity to access information quick and easy (82%), use photo and video camera (80%) and use easy ticketing/reservations/

booking (66%). 48% enjoy game performance and analytics, 46% of fans marked opportunity “to easy buy and order thing” (Table 6).

Table 6. *How Mobile Apps Improve SSCX?*

It doesn't improve my sports experience (1)	8.00%
Access to information is quick and easy (2)	82.00%
I can easy buy and order things I need (3)	46.00%
Easy ticketing/reservations/ bookings (4)	66.00%
Easy and cashless payments (5)	25.00%
Game/performance analytics (6)	48.00%
Easy shopping (7)	38.00%
Memory/Reminders/Calendars (8)	33.00%
Tools such as timer, calculator, clock (9)	43.00%
Photo and video camera (10)	80.00%
Access to communications (11)	24.00%
Other (please precise) (12)	1.00%

Source: Questionnaire, Q6 Answers.

It is important to note, that in the framework of current study, we consider the social media as just a kind of mobile app. The empirical evidence shows that the main role of social media is informational resource, often in terms of second screen. 84 % “surf online during watching game”, 82% use social media to follow favorite athletes and clubs, 66% treat mobile device as a friend in terms of social media, probably satisfying communication and social needs, and then 35% communicate with friends via social media, and 49% use social media to read news and other posts. Some of them make payments (18%) and do shopping on social media (28%).

Important to note, that 2% do not use social media at all and 13% do not use it in sports context, so there are 15% spectators who do not use social media in their SSCX (Table 7).

Table 7. *Social Media in SSCX*

I don't use social media at all (1)	2.00%
I do not use social media in sports context (2)	13.00%
I follow my favorite athletes and clubs (3)	82.00%
I communicate with friends (4)	35.00%
My phone/tablet is a kind of my friend, I communicate with it (5)	66.00%
I make payments (6)	18.00%
I watch spots broadcast (7)	77.00%
I do shopping (8)	28.00%
I read news and others posts (9)	49.00%
I share my posts and media (10)	29.00%
I "surf" online during watching a game (11)	84.00%

Source: Questionnaire, Q7 Answers.

Table 8 demonstrates the negative side. Initially we can assume that apps usage has a negative impact on ability to stay concentrated (68%, 74%) as an

intensity of attention in general (78%). It aggravates memory (79%). 53% notice a link between apps and feeling lonely.

Table 8. *Negative Side Effects or Results of Using Smartphone and Apps in SSCX*

No, never (1)	2.00%
Yes, it makes me distracted (2)	68.00%
Yes, it makes me anxious (3)	49.00%
Yes, it makes me nervous (4)	37.00%
Yes, it makes me feel lonely (5)	53.00%
Yes, it makes me tired (6)	20.00%
Yes, it slows my concentration ability (7)	74.00%
Yes, it aggravates my memory (8)	79.00%
Yes, it causes a headache (9)	44.00%
Yes, it reduces my vision abilities (10)	13.00%
Yes, it slows my attention (11)	78.00%
Yes, but I don't know exactly how to describe this effect (12)	37.00%
I buy too much things by my mobile shopping (13)	25.00%
I don't know at all (14)	2.00%
Other (please precise) (15)	0.00%

Source: Questionnaire, Q8 Answers,

Surprisingly, we find that 65.66% identify mobile device as a friend, joining other 21.21% who confirm that does not feel comfortable without mobile devices (86.87% in total who does not feel comfortable in SSCX without a mobile). Furthermore, 38.38% take a neutral position, choosing answer "sometimes, it depends". 15.15% show no attachment or addiction to mobile device in SSCX (Table 9).

Table 9. *Do you Feel Comfortable Having SSCX without Mobile Device?*

No, I do not feel comfortable without my devices (1)	21.21%
My mobile is like a friend, I do not feel fine without it (2)	65.66%
Yes, it does not matter for me (3)	15.15%
Sometimes, it depends (4)	38.38%
I don't know (5)	4.04%

Source: Questionnaire, Q9 Answers.

The equally leading and contrary responds are "it's handy and useful in many issues" and "it's a negative effect", and moreover in more than 50% cases these two options have been chosen in the same times as a multiple choice.

38% find the positive effect, 34% claim mobile devices enhance their experiences, 31% confirms an effect, but can't describe it. 24 % thanks mobiles for making their payments and shopping easier, joining other 21% for opportunity of buying more and enjoy shopping (Table 10).

Table 10. *Smartphone effect on SSCX*

No, why should it effect somehow? (1)	4.00%
No, there's no link between my device and sports-related experiences (2)	12.00%
Yes, it is very handy and useful in many issues (3)	53.00%
Yes, it enhances my experiences (4)	34.00%
Yes, payments and shopping are easier (5)	24.00%
Yes, I can buy more and enjoy my shopping (6)	21.00%
Yes, it's a positive effect (please precise below) (7)	38.00%
Yes, it's a negative effect (please precise below) (8)	53.00%
Yes, but I cannot identify and describe it (9)	31.00%
I don't know (10)	1.00%

Source: Questionnaire, Q10 Answers.

Testing Hypotheses

H.1. Emotional

Obviously, emotional aspect of fandom is essential. And we have found that mobile apps usage may affect emotional aspect of SSCX positively and negatively. Moreover, we have found many in expected and interesting insights in exploratory spirit from interviewees. For example, Juan Areola, notices a link between emotional and social aspects of SSCX.

Questionnaire Q8.3 and Q8.4 quantitatively indicate the negative side of emotions in SSCX concerning mobile apps in terms of feeling anxious and nervous, disproving H1.1. and H1.2.

H1.1. Usage of apps in SSCX increases anxiety

49% of mobile apps users feel anxiety in terms of SSCX.

H1.2. Active apps users feel nervous in SSCX

68% feel distracted and 37% of mobile apps users feel nervous, demonstrating a level of stress.

Interesting to note, that more than a half of fans indicated anxious and feeling nervous are active users of mobile app, and we found a relation between the level of technology affiliation and negative responses (Q8). It let us conclude that active mobile apps users in SSCX are less stable emotionally.

H2. Social

H2.1. Sports spectators feel socially engaged and supported in grace of technologies

Q4.6-7 show us that 28% use smartphones to communicate about sports and other 27% communicate on various topics. Q6.11 demonstrates 24% who claim their experiences are enhanced by access to communications. From Q10.4 we know, that 34% think, that mobile devices and apps enhance their SSCX in general.

However, all the interviewees confirmed that spectators feel socially engaged and supported by their personal devices and apps (Table 11).

H2.2. Active users of apps in SSCX feel loneliness

Q8.5 answers show that 53% feel lonely during SSCX.

H3. Sensorial

H3.1. Active users of apps in SSCX notice problems with vision

H3.2. Active users of apps in SSCX notice problems with headaches

Finally, both hypothesized from “Sensorial” part are disproved with minor Q8.10 (13%) and Q8.9 (44%). Likewise, the majority of interviewees disproved these statements.

H4. Cognitive

H4.1. Active users of apps in SSCX notice memory aggravation about the match/game details

79% have notices memory aggravation in SSCX (Q8.8).

H4.2. Active users of apps in SSCX are less concentrated (concentration of attention) on the game/match

74% (Q8.7) confirms smartphone and apps usage slows their concentration abilities in SSCX.

H4.3. Active apps users lose focus on game/match sports content

68% (Q8.2) reported they feel distracted because of technologies and apps usage during SSCX (Table 11).

H5. Behavioral

H5.1. Active users of apps in SSCX are addicted to anthropomorphize technologies

Q7.5 (66%) and Q9.2 (65.66%) firmly demonstrate that fans identify devices as friends and have a kind of addiction to technology. It let us confirm this hypothesis.

H5.2. Active users of apps in SSCX consume more “sports fans additional services”

The results of multiple tests Q6.3 (46%), Q6.4 (66%), Q6.7 (38%), Q7.8 (28%), Q10.5-6 (45%) of this hypothesis let us confirm, that mobile apps users consume more additional services, or, in other words, mobile apps may encourage (if it is a purpose, but usually it is) to consume more (Table 11).

Table 11. Summarizing Results of Hypotheses' Testing

Hypothesis	Questionnaire	Interviews	Conclusion
H.1. Emotional			
H1.1. Usage of apps in SSCX increases anxiety	Q8.3 (49%)	1	Disproved
H1.2. Active apps users in SSCX feel nervous	Q8.4 (37%)	2	Disproved
H2. Social			
H2.1. Sports spectators feel socially engaged and supported in grace of technologies	Q6.11 (24%) Q4.6-7 (55%) Q10.4 (34%)	5	Confirmed
H2.2. Active users of apps in SSCX feel loneliness	Q8.5 (53%)	3	Confirmed
H3. Sensorial			
H3.1. Active users of apps in SSCX notice problems with vision	Q8.10 (13%)	2	Disproved
H3.2. Active users of apps in SSCX notice problems with headaches	Q8.9 (44%)	1	Disproved
H4. Cognitive			
H4.1. Active users of apps in SSCX notice aggravations in memories about the match/game details	Q8.8 (79%)	3	Confirmed
H4.2. Active users of apps in SSCX are less concentrated (concentration of attention) on the game/match	Q8.7 (74%)	4	Confirmed
H4.3. Active apps users lose focus on game/match sports content	Q8.2 (68%)	4	Confirmed
H5. Behavioral			
H5.1. Active users of apps in SSCX are addicted to anthropomorphize technological devices	Q7.5 (66%) Q9.2 (65.66%)	N/A	Confirmed
H5.2. Active users of apps in SSCX consume more "sports fans additional services"	Q6.3 (46%) Q6.4 (66%) Q6.7 (38%) Q7.8 (28%) Q10.5-6 (45%)	4	Confirmed

Source: Collected Data.

Conclusions

In this study we attempted to investigate a role and impact of mobile apps and related technologies on SSCX through different dimensions: emotional, social, sensorial, cognitive and behavioral.

We have confirmed that usage of mobile apps may have an impact on SSCX through social, cognitive and behavioral responses. Otherwise, collected data doesn't prove the impact through emotional and sensorial dimensions. Finally, the main hypothesis is confirmed and we proved that mobile apps and related

technologies affect SSCX, however, further investigations and details must be conducted, and we are planning similar studies in the larger scale.

Nowadays, the absolute majority of fans might be considered as active users of mobile apps and related technologies, and just about 2% of fans don't belong to this category. As for an emotional aspect of SSCX, we cannot affirm the link between the fact that fans feel anxious or nervous and using technologies in SSCX.

Employing social media and other time of social types of app (e.g., messengers) in SSCX, users are looking for first of all the information to stay updated, majority of them think apps as a factor enhancing their SSCX in social aspect. However, we have reconfirmed (Pittman 2017, Gezgin et al. 2018, Pancani et al. 2019) that link between using smartphone and feeling of loneliness exists, but should be further explored in terms of SSCX.

Despite recent scholars' finding (Kim and Kim 2015, Park et al. 2015, Pancani et al. 2019) concerning negative impact of technologies on user's sensorial responses, we have not confirmed any clear link between using apps in SSCX and headaches or vision reduction.

From a cognitive perspective, we suggested and confirmed that active users of technologies in SSCX notice memories aggravation about the match/game details and furthermore, active users of technologies in SSCX are less concentrated (concentration of attention) on the game/match.

Empirical evidence demonstrates that fans identify devices as friends and have a kind of addiction to technology. It confirms that active users of technologies in SSCX are addicted to anthropomorphize technologies, including smartphones and apps. Moreover, mobile apps users consume more additional services (Schut and Glebova 2020), or, in other words, mobile apps may encourage (if it's a purpose, but usually it is) to consume more.

Awareness about how mobile apps and related technologies helps to better understand nature, courses and impact of technological devices on SSCX in order to continuously improve the quality of SSCX and sports culture for spectators.

Future Research Directions

We intend to build a technologies usage and deployment optimization model in SSCX, based on empirically measured and identified impact of technologies (focus on mobile apps and XR). This study is a little but solid step to our final purpose.

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Annex

Questionnaire Text

Mobile apps

Smartphones and Sports Experiences

By this short survey we would like to ask you about using smartphones and tablets in sports-related activities. It's about doing and playing sports, watching any kinds and forms of sports and any other activities related to sports. Thanks in advance for sharing your experience!

Question Title

1. Your gender

- M
- F
- Not specified

Question Title

2. How old are you?

- below 18
- 19-25
- 26-34
- 35-46
- 47 -55
- 56 - 65
- 65 and older

Question Title

3. Do you use your smartphone for sports experiences?

- No, never
- Yes, I use it for doing/playing sports or measure sports performance
- Yes, I use it for watching sports
- I make payments or buy things
- Other
- I don't know

Question Title

4. Do you use smartphone or tablet during sport spectating?

- I don't use it
- I use it to get information about sports
- I buy tickets/ order food/ book hotel
- I make payments
- I do shopping
- I communicate about sports
- I communicate on various topics
- I use social media
- I make pictures
- I post in social media

- I don't know
- Other
- Other (please precise)

Question Title

5. What mobile apps are you using in sports?

- ESPN
- Facebook
- Instagram
- Official applications of clubs or events you are interested in
- CBS Spors
- CBScore
- Yahoo Sports
- Bleacher report
- theScore
- 365Reports
- MCN Sports
- I don't know
- Other (please precise)

Question Title

6. How mobile apps improve your sport experience?

- It doesn't improve my sports experience
- Access to information is quick and easy
- I can easy buy and order things I need
- Easy ticketing/ reservations/ bookings
- Easy and cashless payments
- Game / performance analytics
- Easy shopping
- Memory/Reminders/Calendars
- Tools such as timer, calculator, clock
- Photo and video camera
- Access to communications
- Other (please precise)

Question Title

7. How do you use Social media in sports experiences?

- I don't use social media at all

- I do not use social media in sports context
- I follow my favorite athletes and clubs
- I communicate with friends
- My phone/tablet is a kind of my friend, I communicate with it
- I make payments
- I watch sports broadcast
- I do shopping
- I read news and others posts
- I share my posts and media
- I "surf" online during watching a game
- Other (please precise)

Question Title

8. Have you ever notices any negative side effects or results from using a smartphone/tablet in sports context?

- No, never
- Yes, it makes me distracted
- Yes, it makes me anxious
- Yes, it makes me nervous
- Yes, it makes me feel lonely
- Yes, it makes me tired
- Yes, it slows my concentration ability
- Yes, it aggravates my memory
- Yes, it causes a headache
- Yes, it reduces my vision abilities
- Yes, it slows my attention
- Yes, but I don't know exactly how to describe this effect
- I buy too much things by my mobile shopping
- I don't know at all
- Other (please precise)

Question Title

9. Do you feel comfortable about having your sports-related experiences without using your smartphone/tablet?

- No, I do not feel comfortable without my devices.
- My mobile is like a friend, I do not feel fine without it

- Yes, It does not matter for me.
- Sometimes, it depends.
- I don't know
- Any comments? Please let us know.

Question Title

10. Does you smartphone/tablet significantly affect your sports-related experiences?

- No, why should it effect somehow?
- No, there's no link between my device and sports-related experiences.
- Yes, it's very handy and useful in many issues.
- Yes, it enhances my experiences
- Yes, payments and shopping are easier
- Yes, I can buy more and enjoy my shopping
- Yes, it's a positive effect (please precise below)
- Yes, it's a negative effect (please precise below)
- Yes, but I cannot identify and describe it
- I don't know

Any comments? Please be precise.

◀
▶

Questionnaire Results

Q1



Q2



Q3



Q8



Q9



Q10

