Connected Stadium: A Pillar for Football Clubs' Marketing Development?

Charles Bal and Nathalie Fleck

Abstract In this chapter, we explore the notion of *connected stadium* and its affiliate concepts of *stadium 2.0* and *m-stadium*. The connected stadium is indeed a game-changer in the sport industry as it brings within the premises of a stadium a new range of consumption behaviours, based on technology, connectivity and instantaneity. By doing so, the connected stadium comes with new stakes and ambitions for brands, spectators and the clubs operating their stadium. More importantly, the connected stadium stands at the crossroad of two major societal and consumption trends: second screen and the *Internet of Things*. Yet, this major technological shift does not come without deep cultural questioning, especially in France, where stadiums are still seen as a theatre for performances rather than a place to spend time... and and money! Following an introduction into the notion of the connected stadium and its use across multiple stakeholder groups, the chapter concludes with a discussion of what the future holds.

Keywords Connected stadium · Sport consumption · Technology · Football clubs · France

Introduction

With over 300,000 spectators in one single day of Ligue 1—a symbolic record set in October 2014—several stadiums revamped for Euro 2016 and a potential of 100,000 additional seats in the aftermath of the competition, all seemed to be a

C. Bal (✉)
Université Panthéon Sorbonne, Paris, France
e-mail: Bal_charles@yahoo.fr

C. Bal
University of Adelaide, Adelaide, Australia

N. Fleck
University of Maine, Le Mans, France
e-mail: Nathalie.fleck@univ-lemans.fr

green light for French football and its economy. Yet despite this positive momentum, two key data tarnish the most optimistic projections: firstly, the average occupancy rate of Ligue 1 stadiums has been stagnating around 70 % since the 2011–2012 season; and secondly, growing disinterest for stadiums among younger fans, while their interest for sport has not faded (Hammond 2014).

This raises the question of why younger fans tend to abandon football stadiums, while there are still many seats available for them. Why do youngsters prefer the comfort of their couch, or the friendliness of a bar, to the fervour of a stadium? Why do they prefer qualitative TV broadcasts (HD, slow motion, expert analysis, statistics, etc.) to the proximity of a game and emotions that happen a few metres away from them? Why can they no longer stand to be cut off from their online community for 90 min, or prefer a screen over the spectacle of a stadium? In other words, why are younger fans—who are also the most connected—going to the stadium less and less?

Sporting event consumption is a complex phenomenon. All fans are not "ultras"; they do not all see their team as a way to express their own identity, and they do not all remain faithful to one team for a lifetime (Jäger 2013). This results in very diverse sport consumption behaviours, to which recent technological developments (global mobile data traffic increased by 81 % between 2013 and 2014, over 66 % of mobile data will be videos in 2017, 27.7 million mobile users in France and over 50 % of French equipped in smartphone) and new communication habits (7.5 M French access social networks via their mobile) have contributed.

However, instead of bringing the fan to the very source of his emotions—the stadium—his increasing connectivity has brought him closer to his community and the greatest common denominator he shares with it: television. Indeed, television's new digital and social functions promote a collective use of it: richer, more engaging and more participatory; a new function that now positions television as the fiercest competitor of the stadium in France. This evolving competitive landscape pushed Samuel Guillardeau, Stadium Manager of Nice's Allianz Riviera stadium, to affirm that "*before competing against other stadiums, a stadium is competing against television*". Therefore, it is no more surprising to find among sporting event spectators similar expectations to those of TV viewers: access to more content (replays, analysis, slides, etc.), immediate consumption (no queue, no order deadlines, etc.) and continuous connection with their communities (Jäger 2013).

Hence, there is a struggle against lowering occupancy rates and falling ticketing revenues, in which both professional clubs and stadium operators have sought answers to their audiences' new expectations, and to provide them with a real consumer experience on top of the sporting spectacle. This has led to sporting events being enriched with new offers going beyond sports performance, to venture into stands, control rooms and the never-ending relationship that the fans maintain with their communities. This evolution has literally transformed the physical and symbolic boundaries of the stadium, and thus its role among the various stakeholders of a sporting event: teams, fans, sponsors and media. From an isolated place, cut off from the rest of the world and centred on the sport spectacle, the

stadium has become open, turned towards the spectators and, through them, to countless (social) communities outside the stadium. And the stadium has become *connected*.

The connected stadium is revolutionising economic and marketing development models of many clubs, challenges fans' consumption habits—especially in France, where stadiums are more readily considered spectacle venues than social and collective life venues (Söderman and Dolles 2013)—and contests the existing power balance between stadium and television when it comes to sport consumption. For all these reasons, the connected stadium is a major paradigm shift in sports marketing.

The purpose of this chapter, dedicated to the connected stadium and its influence in football economy, is to understand its scope, issues and usages, and to question further the upcoming evolutions.

Definition, Challenges and Technological Developments of the Connected Stadium

In 2012, Facebook revealed the 25 biggest social landmarks in the world, that is to say the 25 most privileged places for fans to geo-locate themselves on the social network. Among them, eight sports stadiums and arenas, including the famous Staples Center of Los Angeles, San Francisco's Wrigley Fields, Barcelona's Nou Camp or Auckland's Eden Park. And when it comes to focusing on the 8 most active cities on Facebook (New York, London, Paris, Berlin, Melbourne, Seoul, Tokyo and Sao Paulo), one to two sports venues are consistently found among the top 5 social landmarks. Two years later, chances are great that the combination of a galloping mobile consumption and the Brazilian World Cup had propelled the mythical Maracana and Arena Corinthians stadiums to being among the most popular venues on Facebook, in 2014!

What should we think about geo-location, as an example of digital interaction happening in a stadium? Is it more related to the concept of connected stadium, stadium 2.0 or m-stadium? What differences should we make among these three stadiums? How do we articulate them? At this stadium, a semantic clarification is important to distinguish these three concepts, and lay the basis for a reflection about the stakes of the connected stadium as we understand it today.

Connected Stadium, Stadium 2.0, M-Stadium: Definition

In its most common usage, the connected stadium is a generic concept denoting a sporting venue which provides its users—clubs, media, brands, spectators—with a number of technologies facilitating the flow of information during an event.

The massive concentration of simultaneous mobile connections resulting in the saturation of 3G and 4G networks, the connected stadium defines by extension a stadium that offers alternative modes of connection for the thousands of people gathered at that time.

However, one may substitute this rather generic definition with the following hierarchy of definitions:

- The **connected stadium** consists of facilitating the operation of a stadium by means of computer and network assistance before, during and after a sporting event. A connected stadium will utilise any technologies enabling the arena to optimise its filling rate, to maximise it match-day revenue (dynamic management of access points, automated restocking of outlets, targeted promotions on the different LCD screens of the arena) and to interact with its environment in order to facilitate the organisation of the event (such as the Amsterdam Arena which automatically sends an SMS to fans advising them about the different commuting options and informing them about the weather forecast for the event).
- **Stadium 2.0** consists of the implementation of technologies that promote the digitalisation of the viewer's experience. This is about enriching the fan's match-day experience by allowing him to operate the lever of the statutory geo-location ("*I was there!*"), to realise his need for tribal experiences (uninterrupted discussion with his community) and to satisfy his expectations for qualitative content (videos, etc.). According to Helleu, the stadium 2.0 refers to "*the idea of a stadium that exists outside of the event, which speaks on social networks and interacts with fans*"; in other words, a stadium meeting spectators' needs for interactivity, before, during and after the sporting event (Chanavat et al. 2014).
- In turn, the **m-stadium** suggests the use of contactless, seamless mobile technology throughout the audience journey in the stadium. The smartphone has thus become a preferred interface, allowing the user to interact with the stadium: to get there, to enter the premises, to find his seat, etc.

As shown by the three definitions above, the connected stadium is a broader and more complex concept than it seems. Indeed, in its broadest approach, the connected stadium encompasses both stadium 2.0 and the m-stadium, in a set of measures that ultimately enrich the spectator experience: easing the access to the stadium, enriching the content offered, encouraging sharing behaviours with the out-stadia and multiplying consumption opportunities.

This "augmented" stadium experience answers several marketing issues, that we propose to detail in the following section.

The Marketing Stakes of the Connected Stadium

To question the marketing challenges of the connected stadium is to put into perspective the interests of the various stakeholders of a stadium—brands, media, supporters and clubs—in enriching match-day experience.

For **brands**, the connected stadium is the opportunity to evolve from a branding logic to a brand experience logic. Thanks to a boosted connectivity and an improved network of screens, the connected stadium makes it possible to enrich brand visibility, to multiply interaction touch points—hence data collection—with the viewer, and immerse him in an "augmented" consumption experience. By engaging the fan in the context of a shared commitment to a team or an event, brands lay the basis for a favourable persuasion context (Crimmins and Horn 1996; Bal et al. 2009) and may identify and characterise more finely their communications to spectators.

For **spectators**, the challenge of the connected stadium is to satisfy their growing needs for enhanced consumer experiences. In 2015, a stadium can no longer be a disconnected enclave! For the modern fan, living the live experience "for real" must no longer mean agreeing to disconnect from his community. Now, the modern supporter requires more than the sporting event that takes place on the field. He wants to access the event without wasting his time on commuting, he wants to comment live on the game with his community, access exclusive content, play games to win tickets or jerseys, benefit from targeted promotions from the official store or bar, and order items without even moving from his seat. Therefore, the connected stadium appears to be a logical evolution of sports marketing, towards more experience, more interactivity and more exclusivity.

For **clubs**, the connected stadium is an ideal tool to bring the fans back in the stands and to generate additional revenue. Indeed, given the economic constraints imposed by the financial fair play, the connected stadium is a way for many clubs to monetise their audience and thus achieve the necessary economic equilibrium. The stakes are high since an attractive stadium—like the new Juventus stadium, 18,000 places smaller than the aging Stadio Delle Alpi, but more comfortable and better equipped, principally in terms of commercial offerings (Palvarini and Tosi 2013)— is a lever to grow customer loyalty by means of match day experience (Shilbury et al. 2009) and to develop new revenue: dematerialised ticketing, in-stadia consumption, access to premium content, etc. For professional football clubs such as PSV Eindhoven or Olympique Lyonnais, for example, the ambition is to generate 30 and 70 M€ respectively of yearly additional revenue through the equipment of their stadiums with connected technologies. These additional revenues will help to reinforce their squad in order to have a chance to take part to the Champions League and its lucrative TV rights.

However, the economic and organisational model of most major stadiums in France (owned by local authorities, built and operated by large private companies and rented by professional clubs) greatly complicates the funding—often considerable—of a connected stadium. Investments that rise to tens of millions of euros,

and sometimes to more than a hundred million euros, as was the case in San Francisco, to equip the Levi's 49ers Stadium with 680 hotspots, 12,000 Ethernet ports and 1700 beacons. Then, who must bear the burden of transforming the stadium into a profit centre? And most importantly, who can benefit from it?

Because in terms of profits, the outlook is booming. Indeed, only 13 % of the French Ligue 1 clubs' annual revenues come from match day profits (essentially, ticketing and in-stadia consumption), while the figure has risen to 25 and 44 % for the British and German counterparts respectively (LFP Report/DNCG 2013)!

For all these reasons, it is now clear that the economic success of French professional football clubs is now closely linked to the place occupied by their stadium in their business model, and to the efforts they will make in order to develop stadium-related income sources (Monna 2013). Indeed, a connected stadium promotes the diversification of match day incomes, maintains these revenue opportunities when the stadium is occupied by another event, and helps control—at least commercially—sports hazards (Chanavat et al. 2014).

However, none of the above-mentioned marketing challenges would be possible without the application of some recent, major technological developments to the sports marketing world in general, and to stadiums and arenas in particular. We intend to present these technological evolutions in the next paragraph.

Overview of the Technologies Implemented in Connected Stadiums

Wi-Fi, RFID, NFC… The technologies employed in connected stadiums are of course many and varied, as shown in Tables 1 and 2, but they all have in common a series of communication goals: they allow us to access information, to store it, analyse it and broadcast it. Among the technologies present in the stadiums, we distinguish *identification* technologies, *capture* technologies, *connectivity* technologies and *analysis* technologies.

Identification technologies are designed to recognise objects and download their data; they usually take the form of bar codes, RFID (Radio Frequency Identification) or NFC (Near Field Communication). Appearing more recently, RFID solutions have gradually replaced barcodes, which are considered too limited in the information and interaction opportunities they offer. RFID chips indeed have the advantage to be read remotely (up to one metre) by the simple means of a radio wave, where bar codes require an optical laser and therefore the installation of

Table 1 Application examples	• The 680 hotspots of San Francisco 49ers Levi's Stadium allow 25,000 spectators to watch—simultaneously—slow motion sequences on their smartphone
	• The Tampa Bay Lightning season-ticket holders receive during the pre-season a team jersey equipped with a RFID chip that allows them to enter the stadium without tickets, to receive special offers and to make all their purchases seamlessly in the arena
	• In Pretoria's Loftus Versveld Stadium, fans can download their tickets directly into their smartphones and flash their devices before the NFC entrance portals to access the stadium

Table 2 Comparing 32 NFL stadiums connectivity in 2014

NFL teams	Stadium	Capacity	Wi-Fi	DAS	Beacon
Baltimore Ravens	M&T Bank Stadium	71,008	No	856 antennas	No
Cincinnati Bengals	Paul Brown Stadium	65,515	Yes	Yes	No
Cleveland Browns	FirstEnergy Stadium	73,200	In 2015	Yes	No
Pittsburgh Steelers	Heinz Field	65,500	193 terminals	339 antennas	No
Buffalo Bills	Ralph Wilson Stadium	71,757	No	200 antennas	No
New England Patriots	Gillette Stadium	68,756	Yes	Yes	No
Miami Dolphins	Sun Life Stadium	75,540	1100 terminals	Yes	Yes
New York Jets	MetLife Stadium	82,500	850 terminals	600 antennas	No
Houston Texans	NRG Stadium	71,054	No	No	No
Indianapolis Colts	Lucas Oil Stadium	63,000	Yes	Yes	No
Jacksonville Jaguars	EverBank Field	67,297	Yes	No	No
Tennessee Titans	LP Field	69,149	Yes	Yes	No
Denver Broncos	Sports Authority Field	76,125	Yes	Yes	No
Kansas City Chiefs	Arrowhead Stadium	76,416	600 terminals	Yes	No
Oakland Raiders	O.Co Coliseum	56,057	No	Yes	No
San Diego Charger	Qualcomm Stadium	70,561	No	Yes	No
Detroit Lions	Ford Field	65,000	Yes	Yes	No
Green Bay Packers	Lambeau Field	80,735	No	Yes	No
Minnesota Vikings	TCF Bank Stadium	52,000	Limited	Yes	No
Atlanta Falcons	Georgia Dome	71,280	500 terminals	Yes	No
Carolina Panthers	Bank of America Stadium	74,455	645 terminals	Yes	No
New Orleans Saints	Mercedes-Benz Superdome	76,468	600 terminals	Yes	No
Tampa Bay Buccaneers	Raymond James Stadium	65,890	Yes	Yes	No

(continued)

Table 2 (continued)

NFL teams	Stadium	Capacity	Wi-Fi	DAS	Beacon
Dallas Cowboys	AT&T Stadium	105,121	1525 terminals	1374 antennas	No
New York Giants	MetLife Stadium	82,500	850 terminals	600 antennas	No
Philadelphia Eagles	Lincoln Financial Field	69,176	600 terminals	Yes	No
Washington Redskins	FedExField	85,000	Limited	Yes	No
Arizona Cardinals	Univ. of Phoenix Stadium	65,000	100 terminals	Yes	No
San Francisco 49ers	Levi's Stadium	68,500	1200 terminals	700 antennas	1700 terminals
Seattle Seahawks	CenturyLink Field	72,000	Yes	Yes	No
St. Louis Rams	Edward Jones Dome	66,000	No	Yes	No

Mobile Sports Report (2014)

specific applications on mobile receivers (such as smartphones). NFC solutions, for their part, are not limited to only reading information. They allow the exchange of encrypted data between two devices over a short distance (about 10 cm), thus emulating complex objects such as payment cards.

Capture technologies allow gathering of information related to events happening on the pitch or in the stadium. Miniaturised sensors enrich the sporting spectacle by adding a new set of data to existing data, aiming at capturing and analysing players' movements, physical parameters and environmental factors. For example, this takes the form of the Goal Line technology adopted during the 2014 FIFA World Cup or the Hawk Eye technology which is now in use in most major professional tennis tournaments, whose use largely feeds the event's broadcast.

Connectivity technologies are related to the synchronisation of different systems. From EDGE to Wi-Fi to 4G, it is all about connecting smartphones or tablets to the Internet or a local network. EDGE, 3G+ or 4G are technologies that provide access to wireless internet within almost all of the territory. While the download capacity offered by mobile operators is increasingly high, sometimes the system cannot bear the burden of a stadium's thousands of simultaneous connections. Local connection technologies, such as Wi-Fi, are then used to decongest the network by offering a multicast content distribution. In other words, the information is not broadcast as many times as there are receivers, but only once to a group of receivers, allowing a substantial saving of bandwidth.

Lastly, **analytical technologies** analyse and transfer data to physically and virtually optimise the stadium life. This is the case for example of the Command Center software developed by American company Roundarch, allowing the MetLife Stadium in New York to monitor, analyse and manage in real time the fans' behaviour in the stadium and to find and implement the appropriate answers:

management of the stadium entry and exit streams, real-time replenishment of stadium outlets, personalisation of the promotions run on the hundreds of screens installed throughout the arena based on the consumer profiles located in each stand, deployment of a "flying" sales force to take in-advance orders when the queues exceed a certain size, etc.

Alex LOTH, *Director of Information Systems*
French Tennis Federation

What is the current position in France, when it comes to Connected Stadium?

The question of the adoption of connected stadiums in France is subject to strong disagreements. Two different schools are arguing: on one hand, those who see in new technologies a way to adapt themselves to new consumption patterns; and, in the other hand, those who reject this idea advocating the very essence of the sport spectacle and the necessary proximity between the fans and the players. Personally, I am a strong supporter of the connected stadium and I believe new technologies really help to enrich the viewer's experience.

What is the "most connected" stadium you went to?

In my opinion, the Kansas City stadium offers, since 2011, the models the more in line with current practices. The audience takes part to the show, from the moment they enter the stadium to the moment they leave it. For example, when the fans flash their ticket at the entry gates, they automatically download on their smartphone a video customized depending on the location of their seat. And few minutes before the game, the fans are invited to turn their phone toward the pitch to take part a giant video tiffo! Fans can also access the coach's explanations about different game strategies, via a dedicated mobile application and a micropayment.

These are all experiences that have helped multiply by 5 in-stadia sales in only few years and raise the average spectators' basket to US$112.

How can a connected stadium contribute to the economic development of a federation?

The multiplication of connected objects and the diversification of mobile device uses make of everyone an actor of the connectivity. But before addressing the ROI question, we must adapt our offers to these evolutions while preserving the sporting spectacle. By allowing the spectator to become a "spect'actor" and accepting his new interaction needs, new business opportunities will logically appear for stadiums operators and advertisers.

For an event like Roland Garros, which lasts three weeks and has no existence the rest of the year, the objectives are primarily to enrich the fans experience at the event and to improve our understanding of our clients in order to provide them with a personalized experience. In this logic, Roland Garros connectivity aims at offering a qualitative services and differentiating experiences, in order to be, in a near future, eligible for an increase in internal and external revenues.

What are the basics of a connected stadium?

Before even thinking about networks and connection technologies, one must wonder about the nature of the services to offer: What do we want to offer to our customers? Then you must think about how to integrate the necessary technologies in the stadium: these are mainly reflections and thoughts of an architectural order. Indeed, it is essential to integrate the objective of connectivity from the earliest stages of the design of the stadium, since it will influence the choice of the construction materials, the architectural principles underpinning the project and the programming of the building.

What do you think will be tomorrow's technology in connected stadiums?

Today, 4G—and the upcoming 5G—carries a lot of rich experiences, especially around video content. In this context, we must expect a transformation of carriers' networks and the emergence of connected services that enhance the multicast consumption of videos. The Internet of Things will also drastically increase the number of interactions stadium networks will have to be able to absorb, and generate new data that will need to be capture, sorted, analyse and actioned. This obviously appeals to the concept of "predictive technologies" which are utterly important to any marketer.

When it comes to information diffusion and relationships with our customers, the Beacon is a technology that we want to experience. Without necessarily being intrusive, the Beacon provides a push of practical information related to transportation, signage, catering or even ticketing that we would like to offer to Roland Garros visitors.

The "MASS Wi-Fi" is also an evolving technology allowing to create a dense and "private" communications belt, permitting the implementation of new service lines able to maintain the best in-stadia relations with our customers…

Finally, in front of regulatory constraints and the necessary debate about Wi-Fi and mobile waves emission fields power, the Li-Fi (i.e. LIght-FIdelity), a wireless communication technology based on the use of visible light, could offer an alternative to existing technologies without generating electromagnetic "pollution"…!

On the Uses of the Connected Stadium

Technologies with previous exposure allow stadium operators and brands to innovate in order to meet consumers' expectations. But of course, implementing these innovations is not an end in itself. To be able to bear fruit, this approach has to

satisfy expectations or enable further development of uses meant for enriching the experience in the stadium.

Between sporting and marketing problematics, the uses of the newly connected stadiums have multiplied though this process.

For Spectators and TV-Viewers

The combination of a place (the stadium), a moment (the match) and means (new technologies) has moved some sporting events into a real crowd-centric communication platform, oriented towards fans. To meet the expectations of a hyper-connected generation, willing to consume more information and to share it, innovations have been implemented to enrich spectators' experiences in the stadium, but also outside the stadium. Three main trends have then emerged: in-stadia interactions, interactions towards the outside and the second screen applied to the stadium.

In-stadia interactions enable spectators to interact more easily with the stadium, teams or athletes, and other spectators. They are supported by innovations, ranging from the dematerialisation of the ticket to applications developed by the stadium itself (e.g. at the Amsterdam Arena or at the Barclays Center of New York), which give information to spectators in real time about the ease of access to the facilities, help them to find their way around the stadium thanks to an interactive map, to participate in promotional games and competitions, to reach exclusive content (composition of the teams in preview, live in the changing-room, access to the microphones of the referees and coaches, etc.) or enable them to order food or other products from their seats.

Interactions towards the outside are based on at least three levers identified by academic research: the need for emotions (Raman and Chattopadhyay 1995), the need to share them (Rimé 2009) and the need for statutory self-assertion, close to the need for belonging by Maslow (1943). Satisfying this latest need requires sharing the event with one's community. In this regard, social networks such as Twitter, Facebook, Foursquare or Instagram are all tools that enable spectators to declare the now 'sacrosanct' "I was here!"

Finally, regarding the practice of supplementing a first source of content, **the second screen** is also a tool in the connected stadium arsenal of services. As the stadiums consider television as their main competitor, they have to propose at least the same services to compete (statistics, solutions of live broadcast, replay, etc.). Thus the second screen enables the spectator to reach, in real time, enriched content linked to the match. To this end, more and more stadiums create their own applications and make use of specialised technological solutions, such as the StadiumVision Mobile solution created by the American giant Cisco. For example, this is the case for the Barclays Center of New York or for the stadium Santiago Bernabéu of Real Madrid. This technology makes it possible, amongst other things, to broadcast information in multicast via Wi-Fi, thus allowing live-watching of a

video stream without any saturation of the network. Integrated with proprietary applications, this solution enables people to re-examine all the actions of the match from the different viewing angles of the video production, and to access, in real time, the diverse statistics of the match. In France, the Olympique Lyonnais's Grand Stade will use this solution to be able to give content simultaneously to 25,000 mobiles.[1]

For Brands and Organisers

The emergence of the second screen and the *Internet of Things* establishes new stakes concerning logistics and business for all the stakeholders: organisation, sponsors and sport teams.

In terms of logistics, connected stadiums provide numerous opportunities to optimise the footsteps of spectators and facilitate the success of events. Two hours before each match, Bayern Munich's Allianz Arena takes control of the traffic lights surrounding the stadium within a radius of 20 km to ensure vehicle flow and fluidity of the access to the stadium!

For organisers, these services represent a boon to optimising the arrival of spectators and the time they spend in the premises. Controls at entry and analysis of spectators' flows enable them to efficiently manage the stock replenishment of stadium outlets.

Regarding business, the stakes of the connected stadium are colossal! For organisers, these services are interesting in that they are extending the time spent by spectators in the stadium. The better the event is organised, the earlier spectators will arrive and/or the later they will leave, thus spending more time… to consume.

Multiplying contact points with people then becomes an essential stake for organisers. First to increase buying opportunities, but also to optimise the visibility of the different partners of the event. For example, the AT&T Stadium, residency of the Dallas Cowboys, organises, with its partners, prediction contests on Twitter, inviting internet users to guess who will score the next goal. Winners are then showcased on the giant screens, offering in the process a little bit more qualified visibility to the partners of the stadium.

For the Sport

Summing up the connected stadium as an enriched offer addressed to spectators would mean forgetting the reason why they are going to the stadium: to enjoy a

---

[1]Source: http://www.lesechos.fr/thema/entreprise-digitale-2/0203545110326-un-stade-connecte-pour-vivre-autrement-les-matchs-de-lolympique-lyonnais-1011044.php?qMv5Jp6CpIicUP32.99.

sporting spectacle. Some technologies implemented in the stadium also serve the interests of the sport and its athletes, before those of the media and spectators.

Since sport has become professional, the perpetual quest for performance helped push ever further the limits of effort. The continuous improvement of equipment, training methods or nutritional plans is part of a desire to advance the human body ever further. In this context, trajectories, heart rates, respiratory rates, acceleration rates, body temperatures, etc. have become data to measure, analyse and (potentially) communicate in a stadium.

Many tools now enable the measurement of these parameters and some are able to emerge. In 2011, American sporting goods provider Under Armour announced the creation of a smart jersey—called "E39"—making it possible to know these physical indicators in real-time. If the tool is only used for training by the Tottenham Football Club for the moment, for the purposes of the medical staff particularly, it would not be surprising that it is used one day during a match to enrich with data a communication addressed to fans.

Sports accessories are also subject to many connected changes. In tennis, the Babolat rackets launched a "Play and Connect" model that enables us to monitor real-time data such as the speed of the ball or the effect upon it by the player, so that it could significantly enrich the viewing of the match for spectators. In football, Adidas also embraced the topic in 2014 by unveiling its connected ball, the "mi-Coach Smart Ball", which can instantly measure information on the shooting power, trajectory, spin and accuracy. All these objects are used to further push the science of sport and to give more entertainment to fans.

What Is the Future for the Connected Stadium?

With ten stadiums built or upgraded for the purpose of hosting EURO 2016 matches, French Ligue 1 clubs will benefit from 100,000 new seats for the 2016–2017 season and onwards.[2] To make this heritage a blessing rather than a problem, leaders of French football have no other choice but to start to learn *stadium seat marketing*. Indeed, in a championship where the stadiums' occupancy rates hardly exceed 70 %—when the occupancy rates are above 90 % every weekend in English and German stadiums[3]—there is no certainty that these 100,000 new seats will be occupied if nothing is done to attract populations to stadiums that do not usually go there or have given up going.

But is making connected stadiums enough to fill them? Obviously not, because the connected stadium is not only a technological evolution, it is an evolution of clubs' economic and marketing models, which deeply affect the role and place of

---

[2]Source: http://www.lepoint.fr/sport/euro-2016-un-heritage-de-100-000-places-qui-pose-probleme-17-10-2014-1873449_26.php.

[3]Same source.

the stadium in the lives of clubs and spectators. When connected, a stadium fosters the implementation of effective loyalty programs, personalised CRM programs according to the stand and the type of ticket of the spectator, algorithms in order to track and optimise the waiting time at the stadium's outlets (snack bars, shops) and real-time restocking. All these services will allow France to catch up a huge lag in terms of filling a stadium and generating match day revenues.

From a sporting theatre, the connected stadium has evolved into an immersive experience; from an entertainment venue, it has become a consumption and communication platform connected with the world. In terms of user experience, the key words become convenience, real time, (enriched) content, interactivity, and of course, monetisation.

As such, and the ambition of Olympique Lyonnais or OGC Nice demonstrates it well, the connected stadium is expected to play a central role in the economic and marketing development of clubs that will invest in it. By concentrating all attention and focusing on fans, and by multiplying opportunities and reasons to consume, football clubs can expect to attract and retain customers, develop new uses and especially attract new revenue.

But to achieve this, the actors of French football will have to align the quality and connectivity of their stadiums with these new ambitions. In effect, the many debates that surround the uses and challenges of connected stadiums—as rich and passionate as they are—will be in vain until the issue of the connections are solved, or at least considered. It is instructive to note that the specifications to be met by stadiums designated to host EURO 2016 matches do not contain a single word about connectivity. Apart from the new stadiums of Lyon or Nice, nothing today indicates that the work conducted in all other French stadiums will actually lead to better connected places.

However, a note of optimism remains in the landscape of French stadiums, considering that the development of clubs' incomes, made possible by connected stadiums, could ultimately partly benefit local authorities. Indeed, some of them—particularly Marseille (with Olympique de Marseille) and Saint-Etienne (with AS Saint-Etienne)—have succeeded in indexing club revenue as a part of the rent these clubs have to pay to use their stadium[4]!

Technologically, the solution to the problem of networks in stadiums could come from the works of the Internet Engineering Task Force on mobile ad hoc networks (MANET for Mobile ad hoc networks), through which devices connect to each other, becoming in turn receiver and router, to form a larger network without requiring a central infrastructure.

But even if the question of technology could be resolved one day, the cultural question will, however, remain. If the connected stadiums have great successes in the United States, in England or in Germany, can we expect a similar success in France, where fans still see the stadium as a theatre for performances rather than a

---

[4]Source: http://sport24.lefigaro.fr/football/euro-2016/actualites/euro-2016-ou-en-est-le-chantier-des-stades-718234.

place to spend time… and money? Could there be, in the French stands, protest movements similar to those of PSV Eindhoven[5] fans who accused the club management—who decided to equip the stadium with Wi-Fi—of diverting them from their primary function: singing and cheering for a team? Or will we see new examples of schizophrenic clubs like Manchester United who, after having decided to offer a Wi-Fi connection to fans, seeks to prohibit them to share pictures and videos on social networks, in order to protect their broadcasters' exclusive rights?

As the top-level sport, the future of the connected stadium is full of uncertainties. This is probably why studying it still fascinates us so much!

Samuel GUILLARDEAU, *Stadium Manager*
OGC Nice
How could a connected stadium contribute to the economic development of a club?
Simply because it enables a club to generate additional revenue through new offerings and new partners. Today, our partners are no longer looking for only panel advertising or VIP seats; they have to tell a story and express their proximity to the club and to the fans. And this is precisely what the connected stadium makes possible. This will be done through connected applications and video content that will be accessible only in the stadium.

Today, the biggest competitors of a club and its stadium are mainly TV broadcasters. We must find and propose in the stadium additional and exclusive contents that are able to counter the contents now surrounding the TV broadcasts of the matches. And we have imperatively to manage to offer that directly in the sport places.

Today, we are no longer mere ticket sellers for football games. We design and sell genuine experiences to increasingly demanding customers.
Who has the responsibility for these connected projects in a stadium like the Allianz Riviera?
The various stakeholders of a stadium do not always have the same interests, except perhaps on the question of the connected stadium. The connected stadium is indeed an added value for the operator of the stadium in its desire to develop a multifunctional use, and for a club like OGC Nice which will use it to attract new fans, develop new revenue, etc.

In Nice, we share a lot about this topic to find solutions, organize investments and the sharing of revenues they generate.
How did it materialize at the Allianz Arena?
We have launched with the stadium operator and the naming partner Allianz many experiments involving Google Glasses, *social walls* for fans, *social rooms* for bloggers and influencers, etc.

---

[5]Source: http://rue89.nouvelobs.com/rue89-sport/2014/08/19/pourquoi-supporters-foot-plaignent-wifi-gratuit-254272.

Today, if we found ways to make those who did not go to the stadium want to come here, we still have to make progress on the activities offered to the spectators in the stadium. This will require equipment and a still more efficient network, contents to offer and share between fans, etc.

References

Bal C, Quester P, Plewa C (2009) Event-related emotions: a key metric to assess sponsorship effectiveness. J Sponsorship 2(4):367–378

Chanavat N, Renaud M, Desbordes M (2014) Naming et modularité: les clés de la réussite? Jurisport 142:41–45

CISCO (2014) Cisco visual networking index: global mobile data traffic forecast update, 2013–2018. Retrieved from: http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white_paper_c11-520862.pdf

Crimmins J, Horn M (1996) Sponsorship: from management ego trip to marketing success. J Advertising Res 36(4):11–21

Hammond T (2014) Stadiums race to digitize: how sports teams are scrambling to keep Millennials coming to games. Retrieved from http://www.techrepublic.com/article/how-sports-teams-are-scrambling-to-keep-millennials-coming-to-games

Havas Sports and Entertainment (2014) FANS.PASSIONS.BRAND. The eight logics of engagement, étude réalisée en partenariat avec le University of Southern California's Annenberg Innovation Lab. Retrieved from: http://www.havas-se.com/news/global-fans-decoded-through-the-logics-of-engagement-in-fans-passions-brands-study

Jäger M (2013) The connected stadium—the advent of the fan experience 2.0 through Wi-Fi? Research report, Institute for Sport Economics and Sport Management, German Sport University Cologne

Maslow AH (1943) A theory of human motivation. Psychol Rev 50:370–396

Mobile Sports Report (2014) Stadium tech report. The football issue: Levi's stadium leads the way for NFL technology deployments. Retrieved from http://stadiumtechreport.com/documents;id=DOC04/

Monna O (2013) Club, collectivité, investisseur privé: organiser au mieux le ménage à trois. Jurisport 128:15–19

Palvarini P, Tosi S (2013) Globalisation, stadiums and the consumerist city: the case of the new Juventus stadium in Turin. Eur J Sport Soc 10(2):161–180

Raman NV, Chattopadhyay P (1995) Do consumers seek emotional situations: the need for emotion scale. Adv Consum Res 22(1):537–542

Rapport LPF/DCNG (2013) Situation du football Professionnel – Saison 2013–2013, Ligue de Football Professionnel – Direction Nationale du Contrôle de Gestion. Retrieved from: http://www.lfp.fr/corporate/dncg

Rimé B (2009) Emotion elicits the social sharing of emotion: theory and empirical review. Emot Rev 1(1):60–85

Shilbury D, Westerbeek H, Quick S, Funk DC (2009) Strategic sport marketing, 3rd edn. Allen & Unwin, Crows Nest, NSW

Söderman S, Dolles H (2013) Handbook of research on sport and business. Edward Elgar Publishing, Cheltenham, UK