Module 1. Innovatiating in Sports

Unit 1.1 Current Challenges and Opportunities in Sports

1.1.1 Introduction and Overview

Innovation is about solving a user problem in a multi-staged process and coming up with novel, feasible and useful solutions to a challenge. Thus, the starting point of the innovation process is a challenge, a problem area with opportunities to innovate.

Challenges in sports can generally be classified in performance-side and commercial-side challenges. Challenges on the performance-side of the game are centered on the identification, training and performance optimization of athletes while the challenges on the commercial-side mainly focus on the attraction of new fans and the delivery of a more delightful and personalized fan experience. On both sides, technology and data strongly enhance personalization and change the relationship between athletes and fans as well as other stakeholders. Technology and data not only change how players are trained and scouted but also how fans "consume" sports and contribute to the sports ecosystem.

Different actors in the sports ecosystem (teams, media companies, sponsors etc.) are constantly confronted with new market realities (technologies, business models, external factors like COVID-19, etc.) or new consumer demands and behaviors (digital, personalized experiences, etc.). This has led to a myriad of challenges on both the performance-side and the commercial-side. Below, some current challenges on both sides are explained in more detail.

Table 1

Overview - Challenges in Sports

Challenge	Type	Main stakeholder	Short description of the main challenge
Challenge 1	Performance-side	Toronto Blue Jays	Talent identification and training: uniform evaluation system.
Challenge 2	Performance-side	FC Barcelona	Health and wellness: reduction of muscle and tendon injuries.
Challenge 3	Performance-side	FC Barcelona	Sports performance: correlation of external and internal load.
Challenge 4	Performance-side	FC Barcelona	Sports analytic: integration of AI into tactical analysis & other areas.
Challenge 5	Performance-side	FC Barcelona	Sports technology: quantification of cognitive performance.
Challenge 6	Commercial-side	Tampa Bay Lightning	New fan experiences: personalized products and services.
Challenge 7	Commercial-side	FC Barcelona	Fan engagement: understanding fan behavior based on data.
Challenge 8	Commercial-side	FC Barcelona	Smart facilities: tech applications for infrastructure development.

1.1.2 Challenges on the Performance-side of Sports

Overarching Challenges

Challenge 1: Talent Identification And Training

The main challenge is to set up a uniform system across the whole sports organization for talent identification as well as training in order to overcome the facts that scouts analyze the players in one way and then coaches train them in a different way:

1. *Definition* of critical athletes' abilities, skills and character traits.
2. *Evaluation and measurement* of athletes' abilities (e.g. ability to create space on the field), skills (e.g. cognitive skills) and character traits (e.g. behavior in locker room).
3. *Training* of these same abilities, skills and character traits.

Traditionally, scouting and training players have been two separate activities. This means that players are evaluated by two different systems, and the information between the two departments of scouting and training is often not blended. The Toronto Blue Jays in baseball is a good example of a club that wants to overcome this challenge by setting up a uniform evaluation system across the entire organization. It includes many different aspects, like deriving better metrics around the positioning on the field or building training devices for better speed, strength and vision of the players. This challenge exists not only in the Toronto Blue Jays but also in all sports organizations around the world.

The main owners of this challenge are the clubs, and the main users are the players. However, depending on the specific sub-challenge, the owner might change, and the

definition of the end-user might be widened to other stakeholders like coaches, analysts, doctors, among others.

Specific Challenges at FC Barcelona

Challenge 2: Health and Wellness

The main challenge in health and wellness is to reduce muscle and tendon injuries and, thus, the time that players are unable to compete on the pitch. It can be split into 3 areas:

1. *Monitoring and analysis of biometrics*: measurement of different aspects of life quality of the players (e.g. sleep, nutrition, etc.).
2. *Diagnosis*: better understanding of how injuries occur and how they can be better located (e.g. thought medical imagery).
3. *Treatment of injuries*: identification of a personalized treatment based on a player's physiology.
4. *Metrics*: better KPIs for "return-to-play" decisions after an injury.

On the performance-side, this challenge is a top priority at FC Barcelona due to the internal expertize the club has in sports medicine. The club has many experts and is well recognized in the area of muscle and tendon injuries. Moreover, this internal challenge highly impacts on the most valuable asset of FC Barcelona, which is the players. Every day the players cannot be on the pitch, because an injury costs the club a lot of money.

The main owner of this challenge is **Dr. Gil Rodas**, innovation manager of Health and Wellness at Barça Innovation Hub (BIHUB). In general, all the challenges are owned by one of the innovation managers who then might delegate the ownership of individual projects to other professionals in the respective team. For example, within this broad challenge of "prevention of muscle and tendon injuries", there are many different projects and verticals, owned by different staff but supervized by Dr. Gil Rodas. The main users are the players. The goal is to diagnose and treat players in a way they feel comfortable and confident, because, ultimately, the decision to go back to the pitch after an injury is also the players' decision.

Challenge 3: Sports Performance

In the area of sports performance, Barça Innovation Hub mainly works on two challenges:

1. *External load*: monitoring the mechanical stress of the players in every training and game.
2. *Internal load*: monitoring how players reacts to this external, mechanical stress (e.g. through the integration of sensors in garments). This data helps to better understand the physiology of the players in different scenarios (training or games) by analyzing its correlation with the KPIs from the external load.

This is also a challenge which has high priority, as during the past years the club has been very active in this area of mechanical load monitoring and optimization. Specifically in football, clubs are not as advanced in monitoring and optimizing sports performance as in other sports. The main challenge here is to monitor physiological biomarkers (e.g., blood, saliva, body temperature, etc.) in a way that it is not invasive. Thus, it is more challenging to measure this internal load than to monitor the external load where players simply wear a device during the training. FC Barcelona wants to take a lead here and be at the forefront when it comes to correlate not only the optimization of the mechanical load but also of the internal load and injuries.

The main owner of this challenge is **Joan Ramon Tarrago**, who manages the physical trainers and the sports performance vertical at BIHUB, whereas the final users are the players. The overall goal of this challenge is to give players more personalized tools to keep or get them in shape and optimize their physical and mental conditions.

Challenge 4: Sports Analytic

A central challenge at BIHUB is the implementation of Artificial Intelligence in order to better understand tactical elements during games. This can be achieved through:

1. *Data generation, analysis and derivation of insights*: more and better data and insights about the collective behavior of a team based on what new KPIs are established.
2. *Automation of manual tasks*: manual analysis tasks can be performed more efficiently and effectively by a machine (e.g. algorithm automatically detects and tags certain game situations on a video recordings based on a training data set).

This might be the most pressing challenge of all the internal challenges at FC Barcelona, followed by the Health and Wellness challenge and Sports Performance challenge (see above). The reason for the high importance and urgency of this challenge is that through

the specific sub-challenges in sports analytics, BIHUB wants to create a cultural change in the organization by delivering value and insights based on artificial intelligence (AI) to many different areas rather than just one specific vertical. The power of AI has still not been explored in the sports world. Although BIHUB wants to collaborate with many different areas within FC Barcelona, they decided to start in the tactical area as this is where they are closer to the final decision-maker: the coach. Once these critical users accept and adopt AI-based solutions, they would also influence other stakeholders and areas. However, starting with coaches is challenging because coaches, other than doctors or physical trainers, are not used to solving challenges by using data. Moreover, emotional and psychological components play a big role in sports; nevertheless, they are difficult to embed and validate in algorithms. Over the last three years, BIHUB has been developing an internal solution in the area of tactical analysis, which is currently gaining traction. Now, the goal is to replicate what has been done on the tactical side for the performance side by using AI for the analysis of injury prevention and performance optimization.

The main owner of this challenge is **Raúl Peláez**, who manages both the day-to-day business of sports analytics and the innovation side at BIHUB, together with **Carlos Bagaló**. End-users here are not only the coaches but also the players, because, in the end, the main challenge of coaches is to communicate valuable insights to players. Therefore, especially when it comes to the design of visualization tools, players are also integrated into the innovation processes.

Challenge 5: Sports Technology

The challenge here is to quantify the cognitive performance of the players (i.e. how players think) with a tech system which complements the experience-based analysis of the coaches. This can be achieved through the following:

1. *New metrics*: to monitor the players' understanding of tactical concepts (e.g. with new markets of devices)
2. *New metrics*: to monitor the players' ability to implement tactical concepts in the game.

In comparison to the vertical and challenges of Health and Wellness, this area focuses more on the question of how technology can help to better understand the cognitive performance and thought processes of players. This challenge has currently less priority at BIHUB. The main reason is that the available monitoring tools, which measure the cognitive performance of the players, are invasive. For example, wearing a helmet during a game would heavily influence and bias players. Less invasive tools must be designed and applied to situations where constraints are invisible.

The owner of such challenges related to cognitive performance and pedagogical approaches to train athletes is **Isaac Guerrero**, who leads the area of sports technology at

BIHUB. Final users are again the coaches and the players. The goal is to create new methodologies and analytical tools that help coaches better understand how to influence and improve the cognitive aspects of the players.

1.1.3 Challenges on the Commercial-side of Sports

Overarching Challenges

Challenge 6: New Fan Experience

The challenge here is to attract new fans and deliver them a more delightful, personalized and flexible fan experience in the physical as well as digital space. This can be achieved through the following:

1. *Social media*: new social media tools help to directly interact with fans and better understand individual fan behavior.
2. *Blending of digital and physical experience*: smart solutions or smart facilities help deliver fans a better gameday experience.

The hockey team Tampa Bay Lightning delivered a great example of the design of a new fan experience that benefited fans as well as the club. Tampa Bay Lightning embedded a digital chip in the jerseys of season ticket holders. By wearing the jersey to a game, fans would automatically get a discount at the store and retail stands. Consequently, the stadium got filled with the team colors, which led to an even better game day experience for the fans and higher season ticket sales for the club. (Best in Class: Sports Fan Engagement, 2020)

Most challenges on the commercial-side of sports are centered on the attraction of new fans and the delivery of a more delightful and personalized fan experience. One very central and interesting challenge in sports is to find ways to increase the lifetime value of a fan, which basically consists of attracting and retaining young fans. For a club, getting a fan to love its brand and sports team at a young age is very valuable, but nowadays that is getting more and more difficult due to plenty alternative entertainment options. Alternative entertainment options as well as technological advancements and now COVID-19 also make it increasingly challenging for clubs to get fans to the stadium. Therefore, providing exiting and safe game day experiences that cannot be experienced at home in order to get fans to the stadium is getting more and more important for clubs.

The main owners of this challenge can be clubs, broadcasters, sports rightsholders or also individual players –basically, everyone who fights to keep the main users (the fans) watching their sport.

Specific Challenges at FC Barcelona

Challenge 7: Fan Engagement

The challenge of fan engagement encompasses two main areas:

1. *Better and more valuable data to understand fan behavior.* This also includes consumption behavior patterns at FC Barcelona stores or facilities (e.g. the question if fans first visit the megastore or the museum).
2. *Design of the new experience, products and services based on data insights.* By better understanding how fans behave, the club can design new solutions that enhance how fans relate with the club in physical as well as digital spaces. It's important to state that 90% of FC Barcelona fans will probably never visit FC Barcelona facilities. Therefore, the creation of the new solutions in the digital spaces is critical. Today, most interactions with fans happen through external platforms, thus, a challenge is to bring these conversations to owned channels, which again allow for a better tracking and design of the new solutions.

Although this challenge is key from a strategic club perspective, it has been quite difficult for BIHUB to bring their innovation strategy to this vertical. Therefore, in practice, this challenge is not really prioritized, and there is still no specific innovation case study on this vertical. During the last three years, FC Barcelona has solely been working on the basics to adapt the systems of the club to a digital business that started with the restructuring of the area, including the change of ownership from the IT department to the Digital department, and the built-up of a proper CRM infrastructure. Now, the club is initiating more projects (e.g., the launch of the OTT or the new membership program) and is also considering co-developments with startups in this area.

The main owner of this challenge is the Digital Director **Enric Llopart**, who manages the challenges in this area also from a BIHUB side.

Challenge 8: Smart facilities

This problem area has several sub-challenges:

1. *Operations and real estate development:* related to the ESPAI Barça Project (project to transform FC Barcelona facilities in Les Corts and the Estadi Johan Cruyff at Ciutat Esportiva), the challenge is to integrate technology in operations and real estate development in order to gather data for a more efficient facilities operation.
2. *Security surveillance:* this challenge make security surveillance more efficient by integrating technology and automating certain security tasks that currently lead to high frustration and time loss with fans at gamedays.
3. *Mobility*: the challenge here consists of managing around 90'000 people coming to Camp Nou at gamedays in a coordinated efficient and sustainable manner (esp. during the 15 minutes before a game when everyone goes through the entrance).
4. *Connectivity*: this challenge is about ensuring good connectivity for the 90'000 spectators who are often experiencing connectivity problems due to the mass in the stadium at gamedays. This is important for having the fans share their stadium experience with the rest of the world.
5. *Energy*: the last challenge is about building more sustainable facilities by integrating renewable energy and new energy solutions. It is also about reaching an overall better energy management by using energy storing solutions to reduce the peak of demand at gamedays.

In this area, the main challenge is to bring the innovation framework to the infrastructure development in order to leverage FC Barcelona's unique real estate: Camp Nou. The stadium has not been updated since 1957 and, thus, it needs to be brought up to modern standards. Therefore, in this area many resources and efforts are put into the process of infrastructure development. The project ESPAI Barça transforms and remodels all Barça's venues and equips them with the latest technology (e.g., 5G mobile technology) (Camp Nou will be the first stadium in Europe with dedicated 5G coverage, 2019). It is important to mention that BIHUB does not solely want to focus on challenges specific to sports but rather interact between sports and other sectors. And here, BIHUB actually demonstrates that they are working together also with companies outside the sports industry (e.g., Cintra software or Catena). For ESPAI Barça, the representative of BIHUB is **Antonio Hernandez**, who not only owns the innovation project within smart facilitates but also works on a day-to-day basis on the project.

Remark (social impact)*:* Although social impact is an innovation vertical of BIHUB, the challenges here are prioritized less, for they are primarily managed by the Barça Foundation. In this area, rather than having a specific project that BIHUB manages in a co-development perspective, BIHUB is more involved in bringing innovation tools to the team at the Barça Foundation, e.g. by offering design thinking workshops in order to find new ways for sports to be able to drive social impact. The main owner of this challenge area is

Barça Foundation, with **Marta Aubia** managing the relationship between the foundation and BIHUB.

1.1.4 Analysis and Discussion

In general, it can be seen that different kind of sports organizations are trying to solve **similar challenges** although the individual problem spaces and **pain points may differ** between the disciplines and clubs. Performance-side innovation challenges at FC Barcelona, for example, are primarily centered on the areas of Health & Wellness, Sports Performance and Sports Analytics. Especially in Health & Wellness and Sports Performance, the club is positioned as a knowledge driver whereas in other areas, like Sports Analytics, they rather depend on outside knowledge. On the commercial-side, challenges at FC Barcelona are structured into the innovation verticals "fan engagement" and "smart facilities". Although challenges around fan engagement have top priority from a club perspective, FC Barcelona does not have a strong skillset yet and has just started with basic projects in the digital space.

This shows that each sports organization sets its own priorities as a balancing act between available skills and resources, and the urgency of the challenges and pain points. Thereby, it can be difficult to identify and select the "right" innovation challenges, especially in the complex and short-term-oriented environment of sports. Different sports organizations pursue **different selection strategies**. In the case of FC Barcelona, Barça Innovation Hub (BIHUB) employs people that have experience both in the day-to-day business and the innovation space in order to identify the most pressing challenges and problem areas. For example, the innovation team knows what challenges the first team is facing from a medical perspective because the manager of the Health & Wellness area at BIHUB is the former doctor of the football first team.

In general, for sports organizations to identify the most pressing challenges, it is fundamental to **know the core reason and ultimate goal for innovating**. Key factors that generally motivate organizations to innovate are revenue growth, brand positioning or non-monetary aspects. In sports, innovation usually occurs to achieve two goals: to improve the performance of athletes or to improve the entertainment of fans. And innovation only happens when these two reasons collide with either sports achievements or profits from media or advertising (Gera, 2020). The creation of Barça Innovation Hub in 2017 reveals another reason to innovate in sports: the diversification of a business model which is highly dependent on sports performance and cycles.

In the light of the current COVID-19 crisis, this move of expanding the club's impact outside the world of sports and mitigating risk by taking a more long-term perspective has turned out to be the right decision. The complete shutdown due to the **COVID-19 pandemic has created many new challenges** in the sports industry, which is heavily dependent on live events. Hundreds of games, tournaments and even Olympics have been cancelled, postponed or played behind closed doors. The loss of revenues from ticket sales

together with the impact on sponsorship deals and advertising partnerships pose huge challenges to professional sports. The sports ecosystem needs to come up with innovative ways to create new revenue streams and keep fans entertained. Sports organizations will need to rethink fan experience, rebuild relationships with partners in the new world, look for new venue and content strategies, get more accustomed to the digital world and create more resilience for the future (Giorgio, 2020) (Hall, 2020). One example is the rise of e-sports as a new way for the industry to bring in money during the absence of live events. Teams started to create video game versions of their sports to keep fans and sponsors happy, although it might yet be a poor substitute of genuine competition in some disciplines. Actually, mainstream sports and e-sports had little to do with each other, but when the stadium closed, the two worlds suddenly found themselves overlapping (Douglas Heaven, 2020). This example shows that the sports industry is forced to adapt and innovate to cope with the short-term as well as potential long-term impact of the current crisis on the professional sports ecosystem.

So, besides the challenges in sports performance, fan engagement, relationship management, venue operations and sustainability, sports organizations are confronted with new performance-side as well as commercial-side challenges due the current pandemic. However, this also means new opportunities for aspiring innovators and entrepreneurs to come up with new products, services or business models in the context of sports. How to proceed and capitalize on new opportunities is explained in the following chapters.

Unit 1.2 Innovation Process

1.2.1 Introduction and Overview

This section examines the innovation process as a whole and discusses its central characteristics and success criteria based on the following three cases from the world of sports.

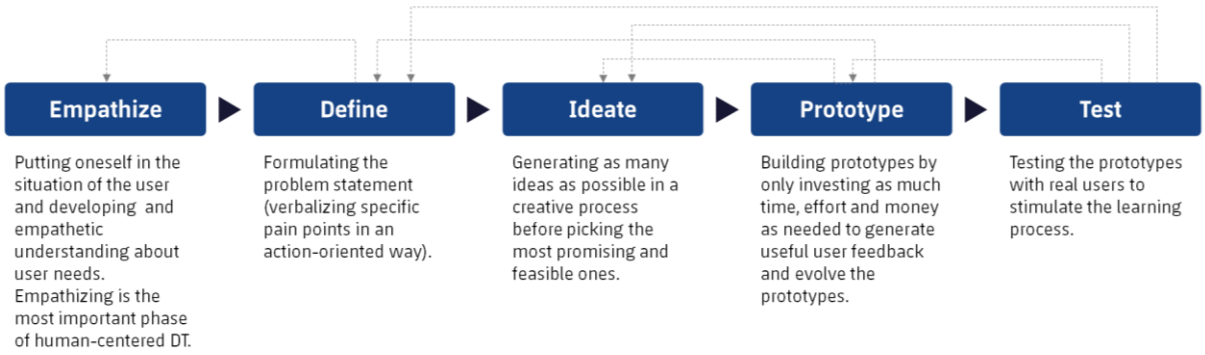
Table 2

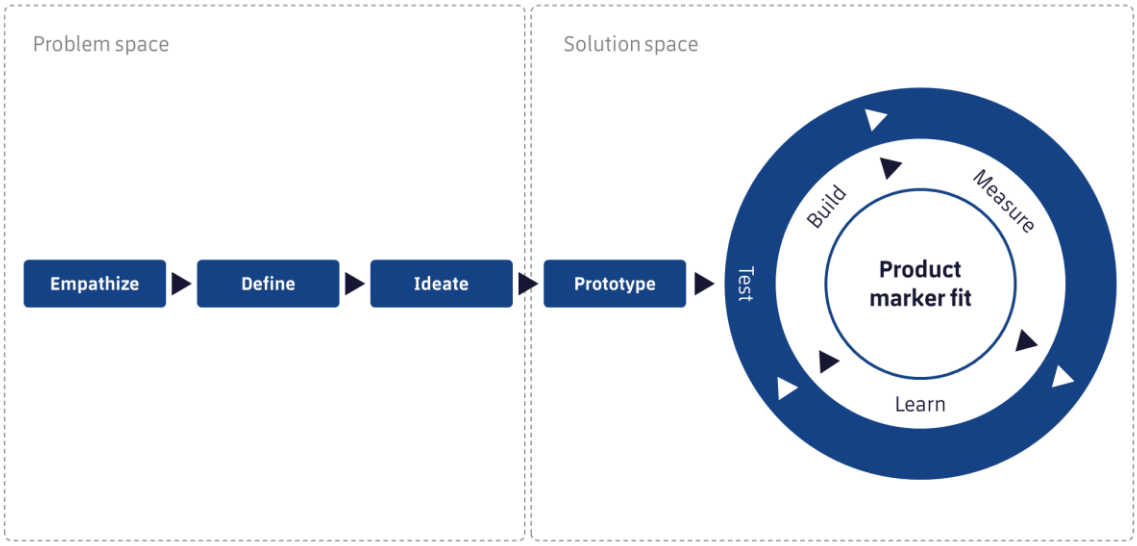
Cases - Innovation processes in sports

Case	Name	Main stakeholder	Short description of main challenge
Case 1	Digitalization of training tasks	FC Barcelona (football)	Create a digital solution for coaches to record their training tasks.
Case 2	ML BAM	MLB (baseball)	Have a uniform web presence across the whole baseball league.
Case 3	FoxTrax	NHL (hockey)	Provide a better hockey viewing experience on TV through colored AR puck overlays.

This course will focus on Design Thinking and the Lean Startup methodology that can be seen as complementary and as two parts of a holistic innovation process. The core benefit of Design Thinking lies in the discovery of user problems and finding solutions for a particular user problem. Thus, it is often applied in early stages of the innovation process. Design Thinking elements serve as inputs for the following testing and validation cycle proposed by the Lean Startup approach based on the Build-Measure-Learn concept. Both methodologies use an iterative process with user feedback at its core.

Figure 1: Design Thinking and Lean Startup





Source: Own figure.

1.2.2 Cases

Case 1: Digitalization of Training Tasks at FC Barcelona

Context and Challenge

Oscar is the assistant coach of a juvenile football team in La Masia (training academy of FC Barcelona). He usually records the different training tasks in Excel sheets in order to have a better overview for his analysis. Like Oscar, many other coaches document their training tasks manually and store the information in their local, personal tools. This decentralized data collection and the lack of a unified system for coaches to document their training tasks have been a challenge for the club. From a corporate perspective, such data about the training tasks is needed to conduct certain analyses on club level, such as cross-correlations between training performances and potential injuries.

Innovation Process

In order to tackle this challenge, in 2018 the IT department of FC Barcelona was assigned with the task to develop an internal application where all football coaches could record their training tasks. The innovation process started to unfold, and soon a first new solution was developed: an application that consisted of the same basic unified structure for everyone but different sub-applications for each area, as the final vision was to integrate data from other critical staff like doctors and also physical trainers. Once the new application was fully developed, the new tool was introduced to Oscar and his colleagues, who were asked to record all the exercises done in the trainings in the new application as from now. This meant that after every training session, Oscar had to manually copy the data from his personal analysis tool to the IT system. Despite the fact that this was a

painful task, there were no clear requirements of how the data should be captured. This resulted in inconsistencies, for the different coaches filled in the data in many different ways or even did not fill it in at all. Consequently, these inconsistent datasets with unstructured data could not be used for any type of analysis on a club level. Moreover, the system did not deliver any valuable insights back to coaches, who just had to fill in the information for the sake of it. Thus, the new system was useful neither for the coaches nor for the club.

This was the situation that BIHUB encountered when the project was handed over to them in 2018. BIHUB redefined the whole project by taking a more user-centric perspective. Their aim was to build a new solution from scratch, which would be tailor-made for coaches. Although there were different market solutions, they were not adapted to the Barça methodology. That is why all the coaches still used their Excel sheets to share and analyze training tasks among each other.

BIHUB brought in the Finnish startup CoPlays, which offered a simple app with a quick-to-produce and effortless layout that helps coaches to create animated drills and give individual feedback to players. Together with this startup and with a group of five coaches from different age categories, the innovation team started to reiterate and realized that the main reason why coaches had not filled in the information was to do with the user interface. By interacting and empathizing with the end-users (i.e., coaches), the team developed a much simpler user interface in an iterative process of user tests and user feedback. Thereby, each sprint was designed and checked by the five coaches. Understanding that each coach has his/her own particularities, the innovation team tried to find a unified approach that would serve everyone. Thus, collaboration was key to improve CoPlays's software with the guidance of the club's coaches to add features personalized to the club's requirements. Finally, the new interface was created in a way that could be used not only as a recording tool but also as an analytical tool, specifically designed for Barça's methodology. Thus, the purpose of the application was redefined. Instead of solely serving as a register for training tasks which delivered valuable data to the club, the application would also serve as a library of training tasks that coaches could use to prepare the training sessions. Therefore, this new solution would not only satisfy the needs of the club by having the application integrated with the central data warehouse but also the needs of the coaches by offering them a full catalogue of training tasks for inspiration and more efficient training preparations. Hence, by taking a user-centric approach, CoPlays and BIHUB, in collaboration with the coaches, solved the initial challenge and developed an innovative training platform where ready-made team exercises could be uploaded to the exercise library and accessed by different coaches at FC Barcelona.

This process of empathizing, defining the problem, prototyping and testing took the innovation team 10 months. In 2019, the new platform was already used on a daily basis across the whole football academy. Furthermore, the club would earn royalties for every uploaded training program onto the general CoPlays use platform with the aim to share

their methodology in coaching with other coaches around the world. Actually, CoPlays works not only with top professional clubs but also with small amateur clubs which usually run on volunteer work with limited resources. In smaller clubs, the coach usually arrives at the training facility 10 minutes before the training starts, so a digital tool that offers ready-made exercise templates from the best coaches worldwide is a huge benefit for smaller clubs, as well. Besides, CoPlays and BIHUB also agreed to sell the finished FC Barcelona coaching platform to other clubs in the future (Ojala, 2019).

Actually, the innovation team wanted to integrate more and more features, but, unfortunately, CoPlays currently struggles with cashflow problems. It is difficult for them to find investors, as they move in a very niche market. At the moment, BIHUB is in the process of evaluating and defining how the club can help them. One option would be to acquire the startup or to buy the software and pay for the development rights. Moreover, BIHUB might also be able to support their growth in other markets, unrelated to the area of management tools for top football clubs.

Case 2: ML BAM – Major League Baseball Advanced Media

Context and Challenge

Back in 1998, the websites of the Major League Baseball (MLB) teams, like the Seattle Mariners or NY Yankees, all looked and felt completely different. However, already at that time, websites were fundamental, as they served as main digital channel and interface between fans and clubs. In order to solve the challenge of the inconsistent digital product across the entire league, the MLB hired a series of consultancies to clean up the websites and create a more uniform, consistent web presence. However, this ultimately did not work out. Subsequently, the MLB decided to tackle the challenge internally. Therefore, they first needed to convince all the 30 MLB teams to collaborate and participate as owners. The League achieved to get them on board with two main arguments. First, a strong digital presence with uniform digital products across the entire League would help to grow the game, since this creates a perception of quality for fans; therefore, everybody would win. Second, the invested equity would be returned within a set amount of time and, more importantly, it would grow over time; so, it would actually be financially profitable for all teams. With these two strong arguments, in 2000 the MLB created an entity called ML BAM (Major League Baseball Advanced Media), in which each of the 30 MLB teams invested 1 million USD every year for 4 years, which led to a total of 120 million USD for the ML BAM.

Innovation Process

The first iteration in 2001/02 consisted of the clean-up and standardization of the websites. The inconsistent web presence of the different MLB teams was the first specific pain point that had to be resolved. Within a year, the ML BAM created uniform team

websites with complete baseball information including game summaries and statistics. At that time, the MLB experienced over 1 million hits on a daily basis across all their websites.

Then, in 2002, Ichiro Suzuki, the first Japanese baseball player who established himself in the MLB, was signed by the Seattle Mariners. This transfer led the ML BAM to the idea of creating a streaming package around Ichiro Suzuki as a first attempt to internationalize the game. However, the experiment failed. The ML BAM learned that to internationalize their fanbase they would need to get better at online streaming, which was still in its infancy back in the early 2000. After the initial failure, they kept experimenting with streaming services and only one year later achieved to be cash-flow positive. They realized that there could be a real business and subsequently started to invest some additional R&D budget. Over the course of 10 years, the team continuously iterated on their streaming solution. They constantly tested new releases in order to get immediate feedback in the form of usage data. Moreover, they did a lot of AB-testing in order to figure out quickly what fans would want to see. They also started to help other media companies with their streaming needs. This actually resulted in another business for the organisation. They used the same back-end infrastructure with their OTT platform and resold it to other partner organizations, like HBO, PGA Tour or NHL, and recognized that the MLB built a superb streaming service which they should use as well, instead of building up everything on their own (Valuetainment. 2018). Apart from web development and streaming, ML BAM was also innovating in other areas like ticketing and online gaming. ML BAM decided to expand their business into these areas mainly by looking at what other players were doing in the marketplace and by really understanding the needs of the core baseball fans. In 2005, the ML BAM bought tickets.com and integrated their own ticketing platform on the teams' websites in order to sell tickets online. In the same year, they were actually able to return the initial 80 million USD back to the team owners. Then, a few years later, ML BAM also entered the gaming industry. Getting into gaming was another successful intent of giving their very specific fanbase what they really wanted. The first version of their baseball game was a failure, the second version was a slight improvement, and finally, with the third iteration, RBI Baseball was created. Thus, besides being a web developer and streaming provider, the ML BAM also started to be a game developer and publisher.

So, over the years, ML BAM built up a very successful business, especially in online streaming. There were mainly three success factors. The first was their first mover advantage and overarching vision; they were the very first league that actually realized that digital would be the way forward, which was still not obvious in the early 2000. The second factor was the huge amount of capabilities and resources they invested in realizing this vision. In the early 2000, ML BAM had 10 times as many digital experts as any other league in the world. And the third factor was the use of iterative processes every time they released something new. They were not afraid of releasing features that were not perfect. Similar to what Apple does today, they released something, got feedback on it, iterated and improved it, got feedback on it again, and so on.

Since the streaming business was so successful, ML BAM spun out the streaming technology into a separate company and formed BAMTech in 2015. Only two years later, a 75% stake of BAMTech was sold to Disney, which valued it at almost 4 billion USD in 2017. Actually, this has been the largest technology born inside of sports up to now.

To conclude, over the course of about 14-15 years, the ML BAM, which was originally created to implement a uniform web presence for the different baseball teams, continuously solved problems for the MLB, from digital products over online streaming and ticketing to gaming. ML BAM is probably the best innovation processes success story in the world of sports.

Case 3: FoxTrax

Context and Challenge

In 1996, Fox Sports started to broadcast the NHL (National Hockey League). The President of Fox Sports, David Hill, struggled to follow the game on TV, as, in his eyes, the puck was hard to follow. He assumed that many casual fans and viewers were experiencing the same problem and believed that this would be the main reason why only a few casual fans had been watching hockey games on TV. Thus, the challenge was to provide a more delightful and easy-to-follow game experience to watch hockey games on TV.

Innovation Process

In order to tackle this challenge, the president of Fox Sports himself had the idea to put a colored overlay on top of the puck so that people could follow it more easily. The puck would get red or blue depending on how hard players hit it. The technology consisted of a circuit board, battery and sensors inside the puck which transmitted signals to sensors in the arena. This data was then sent to Fox Sports computers, where the information was transformed into the different colors so that on television it would produce a glowing trail (Victor, 2011). Actually, Fox Sports was one of the first organizations that added augmented reality components to their broadcasts.

Based on this technology, the new solution FoxTrax was developed and introduced in Fox Sports NHL broadcasting. Although the innovation seemed quite promising, it turned out that the hardcore hockey fans did not like it at all. They called it “the worst sports broadcasting innovation of our time” (Gordon, 2014). They argued that the new technology made the game comical and seem like a video game. They felt like the computer-generated effect interfered with their viewing experience. Thus, although Fox Sports already invested lots of resources in developing the new system, they had to abandon the FoxTrax puck only 2 years later due to the constantly negative feedback from the hardcore fans.

Figure 2. FoxTrax - the glowing puck

Source: FoxTrax - the glowing puck (n. d.) Retrieved October 2020 from https://www.sportsbusinessdaily.com/Journal/Issues/2017/01/23/NHL-at-100/Glowing-puck.aspx screenshot by author.

It turned out that following the puck on TV was actually no real pain point. Fox Sports did not spend enough time understanding the problem to figure out if it was a real pain point or not. They may have done some testing on it and run a few focus groups. However, they conducted these tests with casual fans instead of hardcore fans. Some casual fans might have even responded that they struggled following the puck on TV. Nevertheless, if Fox Sports had dug a bit deeper, they would have found that the main problem was that these casual fans had not been exposed to hockey games very often. Normally, after watching a few hockey games, people can clearly see the puck because they learn how to track it. So, it was not a real pain point. This was the issue.

Although FoxTrax in hockey failed, it was rebooted as an umbrella technology for overlays and augmented reality by Sportvision, launched by the FoxTrax creators. Sportsvision took the tracking technology and augmented reality overlays, and tried to adapt it to other sports. By testing and iterating, they eventually found use cases in baseball and football broadcasts that worked for all stakeholders and fans. Today, it is hard to imagine American football without the yellow first-down line or the line of scrimmage being highlighted on the field, or baseball without pitch tracker and virtual strike zone. The question remains if these innovations would have been possible without the glowing puck (Wyshynski, 2017).

1.2.3 Analysis and Discussion

The innovation process is an **iterative process over time**. Quick and easy innovation is a myth, especially in sports. Sport is about humans, and humans are difficult to change. Therefore, the innovation process can unfold in many different ways and over several years, illustrated by the three examples. In the FC Barcelona and ML BAM cases, it can be seen that the innovation process is not linear and often includes two steps forward and one step back. It is understanding and validating a user problem, developing a new idea and solution, getting feedback on it, iterating and improving, getting feedback on it, iterating and improving, eventually finding a new user problem, validating it, and so forth.

Although this process can look very different from case to case, it follows certain modes, mindsets and principles. One such principle is the importance of **learning from failure,** which becomes obvious in all three cases. Failure is a necessary part of the innovation process, which, by definition, means experimenting with new things; and with novelty, failure comes as a natural side product. So, it is not about eliminating failure in innovation processes, but about learning how to deal with failures in a constructive way. In the example of FC Barcelona, the solution that was developed by the IT department was useful for neither the coaches nor for the club. The end-users (coaches) ended up not using the new system, for it did not bring them any value. When the project was reinitiated by Barça Innovation Hub, the innovation team directly and intensively talked to the coaches, identified the user interface as the main user problem and developed a tailor-made solution for them. In co-creation with a startup and the coaches, they created a much better solution, which was instantly adopted by the users.

In the example of ML BAM, as well, some aspects of the overall success story were failures, such as the initial experiment with the streaming package around Ichiro Suzuki. However, ML BAM built on this failure and improved its streaming expertise over 10 years and it eventually attracted outside clients and became a very successful business. The streaming business was even spun out into a separate company and sold to Disney as one of the largest technology deals in sports. As for the example of FoxTrax, Fox Sports learned from their failure in hockey and successfully pivoted into other sports, now having taken more time to really understand the pain points of the core users.

Learning from failure is fundamental; however, the question is how to learn efficiently from failure. In order to learn fast and not spend too much time and money on a new solution that is doomed to fail, the innovation process needs to be agile and start from simple experiments that later evolve into more complex experiments. The ML BAM is a good example to illustrate this **early, cheap and quick validation** of the most important aspects of a new solution. ML BAM did not try to develop a complete solution of a full website with streaming and ticketing capabilities right at the beginning but rather developed it step by step. They went through several iterations: they started with the clean-up and standardization of the websites and only later added additional features. In contrast, in the example of FC Barcelona, it can be seen that the IT department already

went too far into the software implementation, before even having tested the interfaces with the end-users. If they had tested the most important aspects (i.e., user interface) earlier in the process, they would have saved time and money.

The same counts for FoxTrax, where the lack of an agile innovation process becomes obvious. Fox Sports did not sufficiently validate the user pain points and did not do any testing with the main end-users who were the hardcore hockey fans. Here, the importance of **co-creation and the integration of the end-users and other stakeholders** into innovation processes becomes evident. Just as in the example of FoxTrax, it is a common thing in innovation to neglect the user side. In general, it is critical to differentiate between the owner of the problem/payer of the innovation (sports clubs, media companies, leagues, etc.) and the user (players, coaches, fans, etc.). The involvement of key decision-makers in innovation processes can be a mixed blessing, as there can be the risk that the owner of the innovation challenge gets too dominant. This can be clearly seen in the example of FoxTrax as well as in other failed innovations like Amazon's Fire Phone. The Fire Phone was widely seen as a fiasco because Jeff Bezos, CEO of Amazon, had a really high influence on the innovation process (Carr, 2015). The idea came straight from Bezos's brain, it was his baby, and he drove every critical decision and aspect of the phone's creation. The customer, apparently, became Jeff Bezos. It is fundamental for the success of an innovation not to forget about the real end-user.

The example of FC Barcelona clearly shows how the integration of the coaches in the innovation process led to a more successful and useful solution than in the first iteration, when the IT department did not include the user at all. In sports, the involvement of the end-users (e.g., fans) might be even more important than in other industries, because people take their sports very seriously and any changes can be met with great disdain if they have not been consulted before, something that becomes clear in the FoxTrax example.

Innovation processes should be leveraged not only through the integration of the end-users but also through the collaboration with other stakeholders, especially in such an interconnected and complex area as sports. The ML BAM can be seen as one of the very first examples of **platform creation and ecosystem building,** which has become very important in innovation in recent years. ML BAM was also one of the first organizations that created a marketplace for what initially was their backend, similar to what Amazon did some years later with their cloud services.

Generally, in innovation processes the **right timing** is also a crucial factor. In the example of ML BAM, it becomes clear that the streaming technology only became mature over the years, and ML BAM had to wait for the right moment for the new technology to be accepted and adopted.

To sum up, iterative learning cycles of problem understanding and definition, solution development and quick, early testing should be at the center of each innovation process. These iterative processes can be supported or accelerated by integrating end-users and

other stakeholders into the process, taking an ecosystem approach and acting in an environment that accepts failure as part of the innovation and learning process.

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