

Module 3. Competition and Portfolio Management

Unit 3.1

3.1.1 Technology. New Competitors

Case 9: RealTrack Systems - Technology Perspective

When FC Barcelona first started working with RTS System, they were fundamentally interested in better tracking movement of the players on the field. There were at the time different technologies that could have allowed that. GPS tracking technology offered by RTS was one of them, but there were also others, including the ones that were based on optical analysis. FC Barcelona decided to go with RealTrack Systems and their hybrid technology. For FC Barcelona, working with RTS was a great chance of getting access and participating in the development of a cutting-edge GPS tracking technology, something that only two companies world-wide were doing at that point in time. It has to be mentioned, though, that there were also other companies trying to track players with the means of pixel comparison, for example.

RTS with their then current solution was more in sign with Barça's needs and other solutions showed to be more experimental. The collaboration with RealTrack Systems also promised to provide physical trainers with an accurate tracking system that would collect biometric data of the likes of heart rate, breathing rate and muscle tension which were key performance indicators for their athletes. On the other hand, they were able to evaluate event data sets, determining exactly what happened, when and where, after training sessions, in order to gain tactical insights.

In FC Barcelona's training regime, wearable technologies were mostly used in training sessions, as they enable trainers to track the condition of the athletes in real time and give them many opportunities to track their overall well-being. In football, for tactical purposes, though, you also need optical tracking systems to track 22 players on the field accordingly, but you can also make use of GPS data that allows you to term the position of players on the field. In contrast to other solutions, Real Track's hybrid solution using antenna-based LPS (local positioning system) for indoors and GPS for outdoors provided the trainers with the most accurate data sets. In an ideal scenario, both technologies



converge into one technology that can be used by physical trainers and later on for tactical analysis.

Figure 1: Barça players wearing vests with GPS/EFE



Source: Messi y Rakitic probando los chalecos con GPS/EFE. [Online Image]. Real Track Systems, el primer ejemplo de éxito del Barça Innovation Hub. Retrieved November 2020 from https://www.culemania.com/palco/real-track-systems-primer-ejemplo-exito-Barça-innovation-hub_231195_102.html Screenshot by author.

From a club perspective, the question arises on how to leverage innovation strategy in order to adapt to technology changes. This was one of the main reasons why FC Barcelona decided to work together with RTS. What is more, through a partnership with LaLigaMax, which could ask all their teams to wear devices of RealTrack Systems, RTS got extensive insights into tactical and training data and could share some of these insight with their collaboration partner, the BIHub. This collaboration with LaLigaMax also meant that the likelihood of RTS scaling up and becoming a technology standard was substantially higher. However, the backing of RTS did not mean that FC Barcelona remained blind to what was happening elsewhere and other technologies. Advantages of other optical tracking systems still remained valid and could still become a standard, which is why it has always been important for Barça to keep track of these developments.

Albert Mundet, director of the BIHub, further on describes how FC Barcelona needed to be aware of how technology would evolve in order to know how and when to implement these technologies. For example, they are aware that computer vision still needed to be improved in order to track players better and more reliably. What BIHub does in order to monitor advancements in these technologies is to regularly invite different technologies

to be tested in their testing facilities at the BIHub and subsequently be evaluated by their experts. Startup would gain valuable feedback for their new products, and FC Barcelona could keep an overview on the current level of technology. The main idea hereby is to hedge for potential developments of the technology landscape and, furthermore, parent with complementary partners, as happened with LaLigaMax, in order to avoid betting on the wrong technology.

Finally, what we are seeing is that, in most cases, the sports clubs are not the ones who have the technologies but need to look out for suitable partners with the right technologies to use and/or co-develop, as seen in the case of FC Barcelona and RealTrack Systems.

Case 10: Espai Barça - Building Information Modeling (BIM)

Originally built in 1957, Camp Nou has been an integral part of the club and the city of Barcelona for years. The stadium is historically important but also has an income clocking in at around €212 million. This amount is one fifth of the club's income (for the fiscal year of 2019/2020) so its financial impact for the club has been significant. Due to the financial crisis of the 2000's, FC Barcelona only quite recently, in 2014, decided to completely renovate its crown jewel, which resulted in one of the biggest real estate projects in the sports industry.

Figure 2: Stadium digital model



Source: TheStadiumBusiness. [Online Image]. The Espai Barça project receives award for its innovation. Retrieved November 2020 from <https://www.fcbarcelona.com/en/club/news/728236/the-espai-Barça-project-receives-award-for-its-innovation> Screenshot by author.

Project Director, William Mannarelli, joined the €600 million Espai Barça development in 2014 from Icon Venue Group, a US-based planning consultancy that was also part of the feasibility study. After launching a design competition in 2016, a joint proposal of two architects was accepted. The task at hand was not as easy as initially thought, though. With the club requiring to be able to continue using the stadium throughout the renovations, the project required special technology to be used, in order to satisfy the builder's demands. It was decided to use building information modeling (BIM), an augmented reality (AR) planning tool, in order to help designers and architects during the construction process. Collaboration with two startup companies, leading in the application of AR and BIM technology, enabled FC Barcelona to pull through with the project. Underlining the innovative approach by FC Barcelona, in the end of 2019, the Spanish government made use of BIM technology mandatory for large scale public projects. For Camp Nou, it took one full year to scan the stadium and create a fully digital model of the venue based on point cloud data. Synchro, owned by BIM specialist Bentley Systems, was responsible for processing data and coding that cloud data. During the project, every single agent was able to continuously and in real-time check the progress of the project and the way plans were being executed. This made alignments of different parties much easier and more reliable, making the use of e-mail communication redundant. During the project, BIHub was actively involved in the planning and implementation of before mentioned AR tools and understood the importance of the use of that technology. Further on, FC Barcelona used the Microsoft Holo Lens technology to support planners and designers in the 4D construction of the project. The use of that technology enabled a level of planning not usually attainable in building projects.

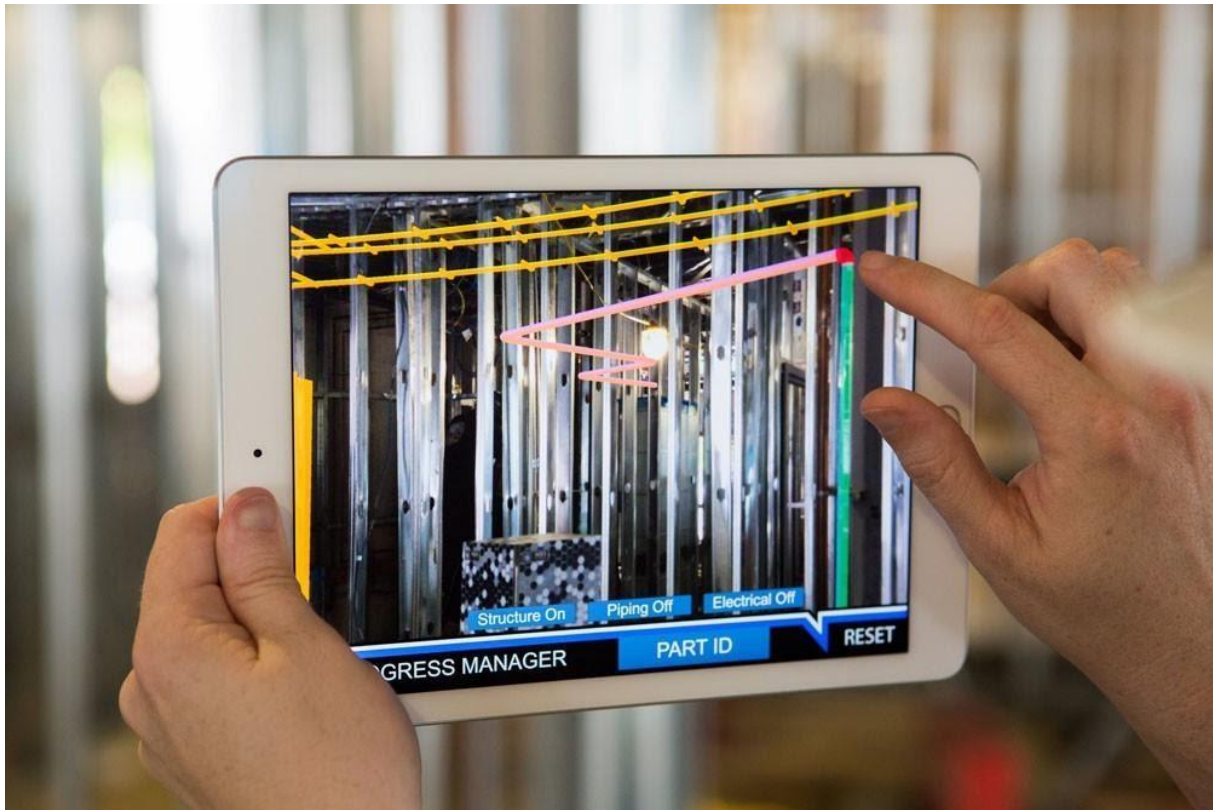
Figure 3: Espai Barça



Source: 'Espai Barça'. [Online Image]. The 'Espai Barça' project will cost Barcelona 815 million euros and be financed by Goldman Sachs. Retrieved November 2020 from <https://www.marca.com/en/football/barcelona/2020/10/05/5f7b5537268e3e3d188b45b6.html> Screenshot by author.

This unique collaboration between cutting edge technology companies and FC Barcelona offered both parties benefits. For FC Barcelona, the use of the technology enabled them to successfully renovate their most important real estate asset while being able to showcase future use-cases of the project to potential investors and city officials. For Synchro, demonstrating their technology for a prestigious project like Espai Barça meant global publicity and gave them a chance to further improve their product. For FC Barcelona, it has not been the last time to use immersive technology with Camp Nou. Currently, they are offering a new virtual reality tour of the stadium for their fans.

Figure 4: BIM technology



Source: AR Will Solve All of BIM's Problems. Retrieved November 2020 from <https://medium.com/@colbygee/augmented-reality-will-transform-bim-into-the-beast-it-was-always-meant-to-be-e170d7357ad9> Screenshot by author.

When finished, the new stadium will have media walls installed throughout the stadium, used to engage crowds, to enhance the atmosphere of the match, and to add additional value for sponsors. This project showcases just another case of FC Barcelona embracing technology in order to improve the full service experience for their fans and athletes.

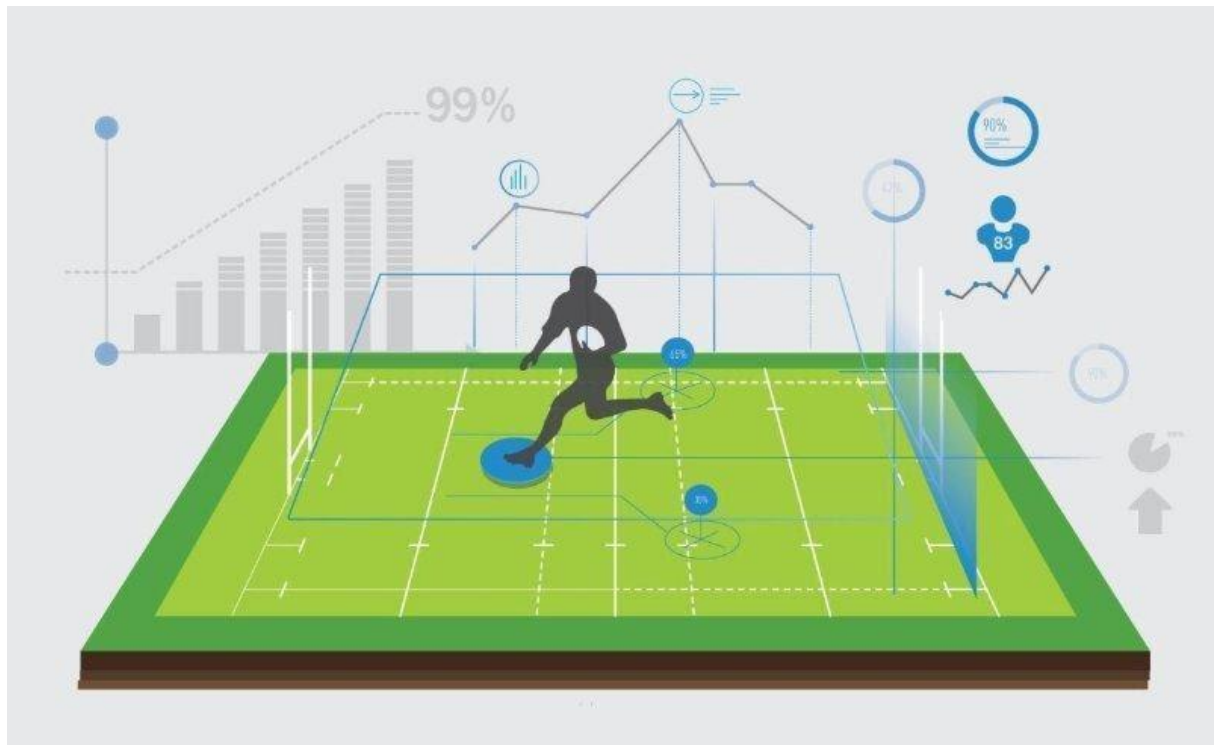
Case 11: Trends to Watch Out For in Sports

An important aspect of innovation in sports is to constantly monitor micro and macro trends and to be aware that many technologies from outside the sports world could potentially be relevant for sports organizations. Over the last 10 years, the primary way to build products for sports clubs has been the so called 'organic approach.' Often, somebody somewhere experienced a pain point and problem, solved it, but kept the solution internally.

As talked about in the last section, the topic of venture building in the sports context will also be more and more important. In venture building, we are seeing tight collaborations between entrepreneurs and sports clubs to fundamentally understand specific pain points bothering the respective stakeholders. The process of simply creating something

and further on trying to find someone to use that specific product as it is a much less efficient method than working together with your user and actually creating something relevant that works. This basically means that it will be more and more important to solve pain points that actually matter with the means of a more user-centric approach.

Figure 5: Sports tech trends



Source: T10 – Sports Tech Trends. Retrieved November 2020 from <https://sportforbusiness.com/t10-sports-tech-trends/> Screenshot by author.

With RealTrack Systems, there has been a change of mantra. Here, the team thought that they had a pain point that was actually slightly different to what the entrepreneur thought. By collaborating with RealTrack Systems, FC Barcelona was subsequently able to co-develop a product that solved their pain points and also improved the product as it was. By making use of bleeding edge technologies like machine learning and artificial intelligence to analyze player data, for example, sports clubs have been able to make radical improvements to sports analysis and subsequently their players' performance. Inside sports, people still think of topics like digital transformation, cloud computing, or CRM as trends to watch out for. It has to be realized, though, that these things have become table stakes, and every single team active in the sports industry would have to incorporate these trends. Also in the context of performance trends like personalization for athletes and training regimes have become table stakes and need to be adopted by everyone these days. Overall, it can be concluded that innovation in sports for the next years will be all about watching macro trends outside sports and very few within sports (e.g., AI, optical tracking systems, wearable and ingestible as well as implantables.)

think about how to move masses to and from stadiums. Users will, furthermore, increasingly demand renewable solutions like, for example, getting a discount when charging their e-bike on the way to the stadium and then parking it at the venue.

Another extremely important macro trend to watch out for in the sports industry would be 5G and cybersecurity. Establishing an infrastructure able to lift the rising requirements for 5G would be already quite a challenge. Not only will 5G technology affect tracking of players, but these data points would eventually also transition into the fan space where movement data could be visualized in real time for fans and extra content for broadcast providers. 5G is expected to feature a multitude of use cases relevant for sports, but, in many cases, the challenge will be to blend physical experiences with digital experiences and subsequently transform these into seamless user experiences. Users are already seeing the trend of primary and secondary screens used for the stadium experience, and it is expected that lots of innovation will happen in these areas.

Finally, we are seeing massive developments and traction in the field of gaming in sports. Fans are nowadays involved in games like online fantasy football leagues, where they are creating and curating virtual football teams, on their own, that are subsequently linked to football players' real-life performance. Mobile gaming has also been gaining massive traction in the last years, and sports clubs, therefore, will want not only to be aware of these trends but also actively tap into them, in order to create future revenue streams, engage their fans and ideally cross-service them on all these different channels. This is crucial for the future of sports clubs, as we are seeing that technologies like online e-gaming are not only changing the industry but could potentially entirely change the meaning of sports.

Renowned expert Steve Gera on this topic said, 'All these trends are getting more and more important but unfortunately many times entrepreneurs building these solutions and platforms are still missing'.

Learners in the field of technology advancements and macro trends in sports should not only read up on sports trends within the realm of sports, as technology in sports is most often about 6-12 months delayed, but must much rather watch and read into macro trends. Innovation and bleeding edge technology advancements are nowadays discussed in online information mediums like Wired & Linked and online forums like Reddit, which are raw hotspots of hard core technology innovations. On these platforms, the latest trends and developments in the technology space are discussed and featured, and are, therefore, important sources for people interested in both sports trends and technology trends overall. Besides, platforms like GitHub, for example, a space where programmers and coders are sharing ideas and technologies, can be a feasible source of technology innovation.



3.1.2 Findings. Technology New Competitors

The technology and competition space can be an area of innovation extremely hard to navigate for organizations. In this context, naturally many questions arise. Actors ask themselves what to focus on and what kind of projects should be developed as a startup or sports institution. Different problem spaces need to be tackled depending on the relevant stakeholders, which could include fans, coaches, trainers and athletes. Finally, different technology spaces add additional complexity and also make this part of the innovation process one of the most exciting.

What is more, participants of the innovation process need to build awareness and learn to watch out for key technology trends. This can be done in multiple ways, but it should be mentioned that innovators in the sports industry should also look outside their own bubble and get involved with this awareness process on a broader scale. Another observation when studying the case of future technology trends is that companies must start to differentiate trends by their level of maturity. Many companies thinking they are working on recent technologies and trends have to accept that many of these technologies and old trends, so to say, have already become table stakes in the innovation environment, and their implementation is nothing innovative anymore but a given one. These trends should already be represented in most sports companies and are not sufficient anymore to differentiate themselves from the competition.

Much more new trends, like neuroscience and ingestibles, might help with a competitive advantage in sports and are expected to shape the sports industry for years to come. It is also highly recommended to look beyond the horizon and explore macro trends happening outside the sports sector, which could be brought into sports. Finally, technological advancements in urban mobility, renewables and AI are expected to dramatically alter the sports business over the next 5-10 years.

Stakeholders can get involved by further developing and joining the process of developing technologies. By finding signals within the trends also known as 'user needs,' where technology could potentially be involved in solving pain points, organizations can stay on top of this process. Next to having an understanding of the technology space, having an understanding of the problem space is extremely important to get involved.

Furthermore, organizations have to decide in which technologies to get involved in and understand that different technologies often require different kinds of investments in terms of capabilities and skill sets needed to develop them. This is why getting involved with too many of them might translate into a challenge for the organization due to overstretching of resources. On the other hand, only focusing on one might not be the best option either, as the risk of choosing the right one persists. As mentioned in previous chapters, a certain approach for portfolio and technology management is preferable in



order to balance and hedge these aspects of technology innovation management. Having a perspective of needs and problems enables companies to select the right projects to focus on. From a technology perspective, preferably actors want to pick future favorite technologies that will be picked up by others. This begs the question of how to know which technology would prevail eventually. Just being aware of trends alone is not enough, unfortunately, and combines should aim to do more. It is not possible to predict the future, but innovation experts believe that the only way to come close to that goal is by becoming part of the process. Companies should know that a future and its outcomes can be created when startups and sports clubs decide to participate in the process of technology innovation.

Finally, actors face the question of the right timing, where they have to establish which technology to choose and where to get involved. In the case of the BIHub and RTS, picking a winner technology was not an option due to many uncertainties. This is where hedging strategies come into place in order to successfully prepare companies for technology innovations and changes. FC Barcelona and RTS case illustrate that tactic nicely. By hedging with both tracking systems, BIHub was not only passively aware of potential changes but was actually actively pushing the trend in their favor. Situational awareness, readiness and being close by are, therefore, of utmost importance. Although often despised by companies, possessing a certain level of patience has been proven important in the space of technology innovation. Waiting for the right opportunity to come in and subsequently having all needed factors coming together is often needed for change to happen, which was also nicely seen with FC Barcelona's RTS case.

For Albert Mundet, this basically boils down to being prepared to any changes technology might bring, but, on the other hand, to being patient enough to jump in with full involvement at any point, when needed. Working both sides and managing this tension are skills that need to be actively managed by sports clubs with the help of internal and external experts. For FC Barcelona, this translated into working with a technology, in this case, tracking devices from RealTrack System and, further on, actively pushing the technology to shape the general development and adoption, but, at the same time, being ready and aware of potential changes they can react to.

FC Barcelona is mixing up the approach of acting fast and developing RTS with full force while, at the same time, with LaLigaMax, taking a more observatory approach. For BIHub, one approach has been to open up their facilities and staff to potential partners wanting to test their solutions on a regular basis. These are approaches that, at least in the case of FC Barcelona, worked well and gave them an edge with regard to portfolio management. Getting the timing right has in their opinion always been of utmost importance.

Finally, we can conclude that, in order to be successful in the process of technology innovation, actors must build a certain awareness, exceeding the realm of their own



industry, get a feeling for timing and ultimately be ready to jump into opening opportunities with full dedication when needed.



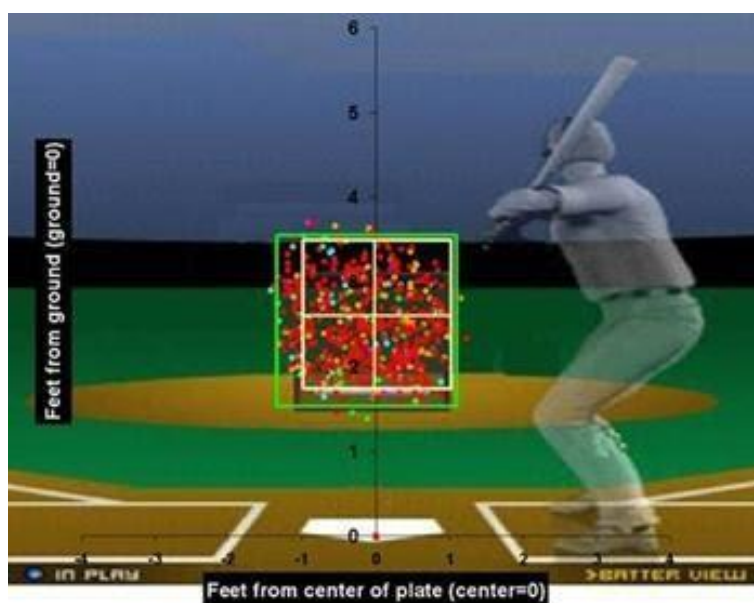
Unit 3.2

3.2.1. Project Portfolio & Data Analytics in Sports

Case 12: Sports Analytics - Major League Baseball

Let's go back to 1858, when Henry Chadwick, a New York sportswriter, developed and established the so called 'box score', a way to describe baseball numerically by tracking various aspects of the game. Data analytics in baseball dates way back and has an unparalleled history with regard to statistics and mathematics in sports. Fast forwarding a century, from the 1960s to the 1990s, the entire statistics for baseball was basically built around point-in-time data. This is data describing actual events happening during the game, such as who did the most hits, who did the most home runs, or who had the highest batting average, among others. Basically, that translated into using data in order to find the best player. It is important to understand that back then contextual understanding of the game, for both players and coaches, was mostly based on these event data sets. That data recording was also predominately based on coaches and assistant coaches taking notes in order to later understand what happened during the game. Albeit video cameras were already being used to broadcast baseball games to national TVs, the technology was too expensive and not advanced enough to be used properly for training analysis. Because back then data analytics was mostly about finding the best players and all teams were bidding on the best player, this resulted in very high prices for top end athletes.

Figure 7: Sports analytics



Source: Feet from center of plate [Online Image]. Lessons learned from baseball analytics. Retrieved November 2020 from <https://community.alteryx.com/t5/Analytics/Lessons-learned-from-baseball-analytics/ba-p/2149> Screenshot by author.

It was in the 1990s when the Oakland Athletics found themselves in a situation where they struggled to acquire these reasonably good players and were basically strapped of cash. They were one of the first MLB (Major League Baseball) teams to adopt a more quantitative approach to the game and particularly player acquisition by focusing on sabermetric principles, a term which refers to the empirical analysis of baseball. Before these developments, the general mantra was that the success of the game mostly relied on having the best players. This approach was changed to a more analytical approach where trainers tried not only to find the overall best players but also to dive more into each individual player's strengths and weaknesses in order to complement them on the field. This basically translated into finding players with certain strengths but overall lower performance than the commonly known top players. By doing this, they aimed to find average, undervalued players which they could subsequently arrange together in a team that was better than its individual parts, the players would suggest. These first efforts can be mainly accounted to Sandy Alderson, former general manager of the Oakland Athletics. It was not until the early 2000s that Billy Beane, who had taken over the general manager position and had subsequently built on Alderson's research, that the Oakland A's went to win 20 games in a row, which, by many, was attributed to the relentless use of statistical analysis, with the foundations having been laid over a decade before. These approaches to data analytics in baseball gained national attention in 2003, when Michael Lewis published the global best-seller *Moneyball: The Art of Winning an Unfair Game* in 2003, in many parts referring back to Alderson and Beane's first efforts of sabermetrics.

Figure 8: Baseball ball



Source: Lessons learned from baseball analytics. Retrieved November 2020 from <https://community.alteryx.com/t5/Analytics/Lessons-learned-from-baseball-analytics/ba-p/2149> Screenshot by author.



In the 2010s, they started to transform from data analytics to data insights. This largely meant to go from just analyzing players, patterns, and the game overall to moving to insights drawn from specific data points. By moving from a general understanding of the game to understanding specific moves and connecting them with statistics, they were able to change the game once again. They not only used data to perform strategic analysis, which is commonly referred to as 'analytics,' but they also went further by analyzing the data and subsequently proposing innovative solutions to improve performance. Through, for example, analyzing the launch angle, changing the patch and swing with the use of technology, in order to show the optimal way to hit homers, they revolutionized MLB. Through the use of sensors and cameras, they were able to analyze the batter space in every detail. Players were shifted, and MLB started to hedge their bets on where the ball would eventually go. For example, they would shift players from the left to the right side, as 80% of the batters went to the right side. These changes were a difficult evolution to accept for most Major League Baseball people, as they were so far against the norm.

Case 13: FC Barcelona & Data Analytics

Football has for years been one of the most traditional and deeply rooted sports in the world. Barça's motto 'Más que un club,' 'More than a club,' underlines this feeling of community and value. For decades the sport hasn't undergone any radical changes though. In 2003, Russian billionaire Roman Abramovich acquired Chelsea, a London football club, for 200 million Euros. This move revolutionized and professionalized the entertainment and also football industry in general. Suddenly, large business consortiums and entrepreneurs were involved in the management and ownership of football clubs, replacing businessmen who had historically held strong emotional ties to their clubs and often the cities as well. Enormous fan bases with global reach and interests fueled large-scale broadcasting rights and merchandise revenues going into the billions. The industry had shifted; football was not just a sport any longer but a full-fledged business operation with various stakeholders involved, many of them seeking profits for their investments.

This change in the landscape also meant that FC Barcelona could not ignore this professionalization entering the industry anymore. In order to stay competitive, it was vital to adapt to what the competition was doing. Barça understood that big data would become more and more relevant, and, therefore, since 2010 introduced a centralized data called COR (meaning knowledge, organization, and performance in the Spanish abbreviation; also heart) in order to improve their processes and leverage their knowledge and assets. This meant a radical shift compared to prior years when all data available to the club was their player's medical leave records. COR collects all kind of data: part of the club, professional or youth, medical records and sports data such as videos



and performance in matches and training sessions. Subsequently, trainers have been able to access a profound database of player data supporting their decision-making process when, for example, deciding who to transfer and sell or reorganize the team from season to season.

Figure 9: Data analytics representative image



Source: Effective Ways How Data Analytics Help to Make a Better Entrepreneur. Retrieved November 2020 from <https://towardsdatascience.com/how-data-analytics-is-helping-small-businesses-re-imagine-growth-opportunities-a33f3defe744> Screenshot by author.

Jumping to 2020, FC Barcelona's data analytics effort have vastly intensified. With many institutions having understood the importance of data for success in this sport, Barça went some steps further with a unique system implemented by Barça Innovation Hub. Its unique approach lies on the management of a whole ecosystem of partners and a collaboration model including different kinds of innovative agents and stakeholders ranging from experts to trainers and industry partners. With the recruitment of Marta Planes i Dropez in 2018, a renowned mind in the tech space, and the creation of the BIHub, FC Barcelona has made data analytics and knowledge creation a club wide strategic priority.

Albert Mundet describes how for BIHub there are two main trends in the realm of data analytics that they are working on:

1. **Event data:** These are data sets that account for isolated situations such as the number of shots on the target, the number of successful passes, etcetera. Data comprises larger data sets and subsequently makes it easier to apply machine learning and artificial intelligence for data analytics. Event data generally relates to final results that can be measured and refers to actions.

create value for the institution or the company on a short-term basis. Incremental innovation efforts are characterized by solving current problems with current technologies. In the example of RTS and the BIHUB, the use of event data and their corresponding data analysis developments could be categorized as incremental innovation where the institution was exploiting their current business models and assets with current capabilities, hence, incrementally improving day-to-day performance with mostly small continuous changes. The other set of data relevant for FC Barcelona, as described in the cases, where contextual data sets, where one would analyze and capture context and spatial information of events happening during the game. A simple example to explain this would be a football pass. In the traditional data set with event data, one would only record two outcomes: the pass was successful or not. In the case of contextual data, many more variables, like the player who initiated the event, match time, the player's spatial position on the pitch, the relative location of opposing players, etc., would all be taken into consideration and can, therefore, if analyzed correctly, give a much more complete picture of what happened and why. Here, the use of exploratory data sets and potentially relevant development of data analytics and AI efforts would hence be referred to as 'radical innovation.' These are capabilities currently not readily available and in the development phase for FC Barcelona, and would, therefore, better classify as radical innovation, exploiting future business models and revenue streams with future capabilities.

Oftentimes, companies are compelled and incentivized to mainly focus on short-term innovation efforts. In the sports environment, there is more attention to short-term performance because of the need of winning the next game. Unfortunately, this can often be the wrong strategy, as many companies and also sports teams only focusing on incremental innovation efforts are subsequently disrupted, e.g., by another technology or a different business model from a competitor. Radical innovations naturally take much longer to develop, and it shows that for companies missing out on these investments, when the future comes, it is often too late to start this innovation process. By doing that, companies are not investing in their long-term goals and are running risk of missing radical innovations that take much longer and also much more resources to implement.

For all these reasons, a balanced project portfolio approach where incremental and radical innovations are in the right equilibrium is key for companies seeking to be successful in the long run. This allows both investing in incremental technologies where current capabilities are exploited and investing in exploratory projects where companies can learn how to develop future projects that will create advantages in the long run. Oftentimes, incremental projects are the ones that create financial benefits for institutions by solving current pain points, creating efficiencies, increasing profits or providing growth. Long-term projects, or radical innovation, will enable institutions to thrive and survive by hiding against potential disruption and challenges in the long run. Radically



innovative projects like the move to biomechanics, kinematics and human movement would classify as radical projects that would be important in the long run.

Steve Gera, US ambassador for FC Barcelona, describes what a successful portfolio management process would subsequently include. There are three main activities:

1. Solving challenges of day, which are immediate pain points and can be considered table stakes. This is what most sports teams are doing, such as improving nutrition of their players.
2. Trying to create competitive advantages and differentiating yourself against the competition as opposed to just solving problems. In the sports environment, nowadays, some teams are, for example, using event data recording, data analytics and data insights in order to differentiate themselves from the competition. MLB Bam introducing their video platform and actively changing the sports landscape and the way in which fans consumed and followed games could be considered a radical innovation.
3. Investing in moonshot ideas in order to hedge your bets against being disrupted by other technologies. Only very rarely do sports teams involve in moonshots activities and are, therefore, from an innovation perspective, endangered to be disrupted. An example for this could be what the Oakland Athletics did in the 1990s, which completely changed the way Major League Baseball was conducted further on.

Finally, it can be said that companies should at all times focus on incremental innovation, but at the same time, they should not forget to foster radical innovation within their organizations in order to help them thrive in the future. A balanced portfolio strategy where short-term benefits and improvements and long-term interest in order to survive should be striven for by most modern companies and organizations.



List of Acronyms and Abbreviations

AI	artificial intelligence
AR	augmented reality
BIHub	Barça Innovation Hub
FCB	Football Club Barcelona
FIFA	International Federation of Association Football
KPI	key performance indicators
MLB	Major League Baseball
ML BAM	Major League Baseball Advanced Media
MVP	minimum viable product
NBA	National Basketball Association
NFL	National Football League
NHL	National Hockey League
OTT	over-the-top
RTS	RealTrack Systems
WWE	World Wrestling Entertainment



References

Nagji, B. & Tuff, G. (2012, May). "Managing Your Innovation Portfolio", Harvard Business Review, Retrieved November 2020 <https://hbr.org/2012/05/managing-your-innovation-portfolio>

Porter, M. E. (1985, January). "Technology and Competitive Advantage", Journal of Business Strategy, Vol. 5 No. 3, pp 60-78., <https://doi.org/10.1108/eb039075>

Ricky, A. (2019, January). "How Data Analysis In Sports Is Changing The Game", Forbes Technology Council, Retrieved November 2020 <https://www.forbes.com/sites/forbestechcouncil/2019/01/31/how-data-analysis-in-sports-is-changing-the-game/>

[Screenshot of Culemania official website]. (n. d.). Retrieved November 2020 from https://www.culemania.com/palco/real-track-systems-primer-ejemplo-exito-barca-innovation-hub_231195_102.html

[Screenshot of FC Barcelona official website]. (n. d.). Retrieved November 2020 from https://www.culemania.com/palco/real-track-systems-primer-ejemplo-exito-barca-innovation-hub_231195_102.html

[Screenshot of Marca official website]. (n. d.). Retrieved November 2020 from <https://www.marca.com/en/football/barcelona/2020/10/05/5f7b5537268e3e3d188b45b6.html>

[Screenshot of Medium official website]. (n. d.). Retrieved November 2020 from <https://medium.com/@colbygee/augmented-reality-will-transform-bim-into-the-beast-it-was-always-meant-to-be-e170d7357ad9>

[Screenshot of Sport for Business official website]. (n. d.). Retrieved November 2020 from <https://sportforbusiness.com/t10-sports-tech-trends/>

[Screenshot of IAM Wire official website]. (n. d.). Retrieved November 2020 from <http://www.iamwire.com/2017/07/sports-tech-capital-investments/155356>

[Screenshot of Community official website]. (n. d.). Retrieved November 2020 from <https://community.alteryx.com/t5/Analytics/Lessons-learned-from-baseball-analytics/ba-p/2149>

[Screenshot of Towards Data Science official website]. (n. d.). Retrieved November 2020 from <https://towardsdatascience.com/how-data-analytics-is-helping-small-businesses-re-imagine-growth-opportunities-a33f3defe74>

