

# Module 2. Understanding the Problem Space

## Unit 2.1 User Empathy

### 2.1.1 Introduction and Overview - The Heart of Design Thinking and Innovation

Empathy is the foundation of the whole Design Thinking process. Tim Brown (2013) from IDEO formulates it the following way: **“without understanding of what others see, feel and experience, design is a pointless task”**. Empathy is a journey into the feelings of the users. Innovators and entrepreneurs must immerse themselves in the user experience to uncover deep user needs. Thus, the goal of this stage is to derive valuable insights about user needs.

Table 1  
*Cases - Empathy*

Case	Name	Main stakeholder	Short description of main challenge
Case 4	Adidas Soccer Cleats	Adidas (football)	Design a more flexible, lighter and controlling soccer cleat.
Case 5	RealTrack Systems	FC Barcelona (football)	Access more accurate data to monitor athletes' performance.
Case 6	New NBA Ball	NBA (basketball)	Introduce the new micro-fiber basketball in the NBA.
Case 7	Heinz Ketchup Bottle	Heinz (non-sports)	Design a new ketchup bottle packaging.

### 2.1.2 Cases

#### Case 4: Adidas Soccer Cleats

##### Context and Challenge

In the 1954 soccer World Cup in Bern, Switzerland, the Germans lost 8-3 against the Hungarians in the group stage of the tournament. Hungary's legendary “golden team” had remained unbeaten in 31 matches and was considered one of the best teams in the history of football. Then, in the final, also known as “the miracle of Bern”, Germany had to confront Hungary again. This World Cup final has been one of the greatest and most unexpected



matches in World Cup history. As the clear underdog, the German national team beat the heavily favored Hungarian national team 3-2. Contrary to the good weather conditions in the group stage match, the final was played in heavy rain. These muddy conditions played in favor of the German national team, which wore the new Adidas cleats, designed by Adidas founder Adolf Dassler, for the first time.

Figure 1. Adidas Soccer Cleats



Source: Adidas Soccer Cleats (n. d.) Adidas Argentina [Online Image]. A History Of Adidas World Cup Football Boots 1954 – 2010. Retrieved October 2020 from <https://www.footy-boots.com/adidas-world-cup-football-boots-archive/> screenshot by author.

These soccer cleats with exchangeable, screw-in studs helped German players gain better traction and grip in the mud due to the longer studs. Thus, the new Adidas cleats were a remarkable innovation that heavily supported the first World Cup victory of the German national team (Fleenor, 2014).

### Innovation Process

Adolf Dassler put a great focus on empathizing with the end-users who were the players of the German national team back in 1954. In order to better understand the needs and pain points of the soccer players related to cleats, he tried to put himself into the players' shoes. He assisted trainings of the German national team as well as of lower level teams on a regular basis, standing by the sideline and talking to players while taking notes. He studied actual cleats and had many conversations with players to identify ways to improve performance from a footwear perspective. Besides directly interacting with players, he simply observed how they were moving and changing positions on the pitch. Since he immersed himself over a longer period of time, he could also observe players in

different weather conditions. Interestingly, he noticed that players were often slipping around in muddy conditions on rainy days. This observation was the trigger for an innovative idea: to put longer, interchangeable spikes into the shoes for a better grip in muddy conditions. As a footwear manufacturer, the founder of Adidas could refer to other cases of use, which allowed him to make cross-connections with other contexts like the military or mountain climbing. Thus, Adolf Dassler's ability to think in a broader context, in combination with his ability to empathize with the user problems of football players, led to the idea development and design of the actual cleats with interchangeable spikes.

Figure 2. Adolf Dassler



Source: SZ Photo [Online Image]. Firmengründer Adi Dassler (19000 – 1978), montiert Schraubstollen. Retrieved October 2020 from <https://www.sueddeutsche.de/wirtschaft/adidas-70-jahre-adi-dassler-herzogenaurach-1.4531955> screenshot by author.

A very similar approach and methodology of designing athletic footwear has later been used in other sports as well. **Case 12** outlines how Tinker Hatfield, one of the world's most legendary footwear designers, designed Nike's most popular athletic shoes in running and

basketball by closely listening to athletes and taking inspiration from a broader context in order to solve the problems athletes encountered.

## **Case 5: RealTrack Systems**

### Context and Challenge

At the end of each season, all the different departments of FC Barcelona come together to review the past season and identify possible improvements for the next one. In July 2014, the team of physical trainers at FC Barcelona addressed the issue of not getting accurate data regarding the athletes' performance on the field. More specifically, this problem was mainly present in indoor sports, as the only system used at that time was based on GPS technology which does not work properly indoors. Therefore, the physical trainers were looking for an accurate tracking system that would collect biometric data such as heart rate, breathing rate and muscle tension, and that could be used for indoors and outdoors sports.

Back in 2014, the initiator and owner of the new technology was Joan Ramon Tarrago, Head of Sports Performance and manager of the physical trainers. Since the club did not have the resources nor the capabilities to develop its own device from scratch, Joan Ramon Tarrago decided to approach different organizations that claimed to offer a technology that would fit FC Barcelona's requirements in terms of accuracy and reliability. However, this approach implied sharing information about internal challenges, which was not a standard practice at FC Barcelona at that time. In the end, the management decided to support Joan Ramon Tarrago.

The Head of Sports Performance contacted several manufacturers aiming to benchmark the different tracking systems available on the market and to identify the best suited device for FC Barcelona's needs. Finally, four different solutions were selected to be tested during one season in the four indoor sports of the club – handball, roller hockey, basketball and futsal. During this testing phase, Joan Ramon Tarrago and his team of physical trainers aimed to understand which one of the four solutions would best solve their problems. In this process, they discovered the startup RealTrack Systems (RTS)<sup>1</sup> from Almeria, Spain, which offered a hybrid indoor-outdoor technology with high accuracy, reliability and usability. Contrary to the other solutions, RTS's wearable “Wimu” supported both systems - antenna-based LPS (local positioning system) for indoors and GPS (global positioning system) for outdoors. Furthermore, while most solutions used a closed cloud and software infrastructure, RTS offered the possibility to integrate with 3<sup>rd</sup> party sensors via an open platform. Lastly and most importantly, RTS was selected due to their willingness to co-create and adapt their technology “Wimu” to the requirements of the club. Thus, RTS was offered a contract to co-develop a solution tailored to the needs of FC Barcelona (Lemire, 2019).

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<sup>1</sup> See <http://www.realtracksystems.com/wimu-pro/>



## Innovation Process

By accepting the co-development, a close partnership between FC Barcelona and RTS began. The RTS team moved from Almeria to Barcelona to start working on the further development of the product together with Joan Ramon Tarrago and his team. More specifically, RTS was offered an office right at the basketball court where the basketball players, who were now wearing the new devices, trained on a daily basis. This proximity to the users and the embedding into the day-to-day operations was crucial for RTS as it allowed them to observe the athletes and empathize and interact with them on a continuous basis. Besides assisting to every single training session to better understand how players were reacting to the devices, RTS also worked very closely with the 25 physical trainers, as not only the athletes' needs but also the physical trainers' needs had to be understood and satisfied. Every week as part of an internal workshop, RTS together with the 25 physical trainers discussed the reliability and usability of existing performance metrics, ideas of new metrics and general improvements (Lemire, 2019). Hence, through many conversations with both the physical trainers and athletes, the team derived insights and ideas that led to the final product design and a new KPI report.

During the first year, RTS mainly worked on the improvement of the product design. The challenge was to design a comfortable, easy-to-wear solution for all disciplines. During this time, the team worked very closely with the athletes, which meant that they observed players during their training sessions and subsequently asked them for feedback on the new design elements.

Then, in the second year, the main focus shifted to the enhancement of the performance reports. FC Barcelona was one of the first sports teams to recognize the importance of collecting and evaluating data and to adopt a system that combined the use of EPTS (electronic performance tracking system) and calculation programs, where the information from the tracking devices was transferred to for evaluation and visualization purposes (WIMU, the device that tracks athlete data, 2020). The challenge here was to define, with RTS, the 25 physical trainers and Joan Ramon Tarrago, how the FC Barcelona performance report should look like. In collaboration with the analysts and coaches, the team reviewed existing performance KPIs, designed and validated new ones, and also developed new ways to visually display and communicate these KPIs. In weekly meetings, the different actors discussed the relevance and value of different KPIs with the aim of creating a useful report for their final users - the coaches and ultimately the athletes. Thereby, the 25 physical trainers not only evaluated and provided feedback on the current product developments but also proposed new ideas for KPIs or data visualizations. Apart from these weekly meetings, RTS interacted with the physical trainers on a daily basis at the basketball court, to get instant feedback on product adaptations and provide trainers and athletes with real-time insights around the physical performance of the players right there on the court. A specific example of how RTS adapted its technology to fulfil the club's requirements and deliver accurate data for new KPIs is the development of the built-in ANT+ sensor to record electromyography data. For



instance, in the recovery process of an injured player, electromyography data can help to conduct more detailed analyses when connected to other external devices. This possibility fine-tuned the tracking system to the maximum and made it even more useful for coaches. Hence, over the course of two years, RTS improved the design of the user interface and developed an enhanced reporting and visualization tool based on the feedback of the main users (i.e. players and physical trainers). In this iterative process, RTS continuously tested and validated different prototypes - initially with indoor sports teams and younger teams at La Masia and subsequently with more senior teams. This testing process had to be designed without risk, as the new device could not have impaired the performance of the first team in critical matches.

Finally, in the third year of the project, the new tracking system delivered measurable improvements and was ready to be tested and introduced in the first football team. The device was successfully adopted by the first football team in the 2017/18 season and its use was extended to all training sessions at the club. At that time, Barça Innovation Hub (BIHUB) was established as a new organization inside FC Barcelona. Thus, RTS was the first innovation case at FC Barcelona and marked the birth of BIHUB with its mission to “create an ecosystem to boost research, innovation and knowledge to generate value for the club and society in a wider sense.” (Visnjic, Volwahren, Mundet & Chesbrough).

Figure 3. Wimbu



Source: Ruiz, M. (2018). El chaleco negro que usa el Barça ya triunfa en todo el mundo. Mundo Deportivo. Retrieved October 2020 from <https://www.mundodeportivo.com/futbol/fc-barcelona/20181119/453038785272/el-chaleco-negro-que-usa-el-barca-ya-triunfa-en-todo-el-mundo.html> screenshot by author.

After this success with FC Barcelona, RTS continued to grow. Instead of protecting the innovation from opponent sports teams, FC Barcelona knew that if RTS acquired more clients, the club could then benefit from more data points to make even more accurate predictions. Therefore, RTS soon celebrated its first successes outside of FC Barcelona as well. Wimbu was introduced in all the clubs of “La Liga” as well as in the national teams of Spain, Russia, Costa Rica and a few other countries. But the story does not end here. RTS keeps innovating together with BIHUB by currently trying to incorporate and embed new internal load sensors into the device with the ultimate goal to correlate external and internal load.

## **Case 6: New NBA Ball**

### Context and Challenge

In the summer of 2006, the National Basketball Association (NBA) introduced a new ball in cooperation with its official partner Spalding. It was the first change to the ball in over 35 years (Roth, 2017). The reason why the league decided to displace the traditional leather ball by a microfiber composite ball was that the sports good manufacturing industry considered microfiber material the next generation of technology in basketball (Gaine, 2017). Thus, the NBA wanted to benefit from the new technology in order to improve the game performance by making the ball more consistent in the way it bounces, which has been one of their overall ambitions over the years. Moreover, college and leisure leagues were already using the new ball since the early 2000s.

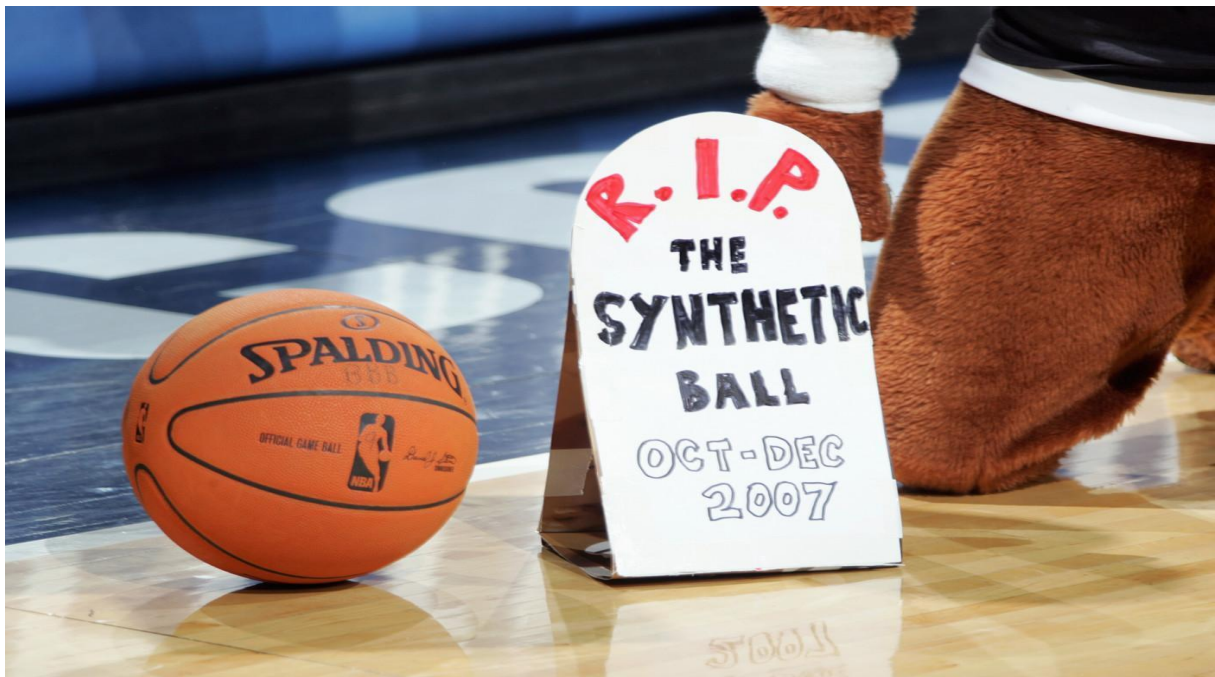
### Innovation Process

Since the new synthetic ball was already adopted in lower leagues, Spalding concluded that it would also make sense for the NBA to introduce the new ball. Hence, soon afterwards the NBA and Spalding announced the change from the leather ball to the microfiber ball. However, NBA players were neither consulted nor given a testing period to get used to it. The first time NBA players experienced the new ball was during training camps and pre-season games, shortly before the new season started (Robbins 2006). Thus, the most important factor, the view of the NBA players, was not considered at all. Additionally, it turned out that the feedback concerning the performance of the new ball that Spalding received from lower leagues was not very reliable. Lower league players complained a lot less and were not really incentivized to tell the truth as they feared that complaining would hinder them in moving up to higher leagues. However, once the premier players got their hands on the ball and realized that it played differently, Spalding got drowned in negative feedback. NBA players, who naturally were in touch with the ball on a highly frequent basis, were not satisfied at all. The main issue was that the surface had more friction, which caused little cuts in the players' fingers. Other complaints were that it was slippery when wet and that it bounced differently than the leather ball, which was confirmed by scientists later on.



The constant negative feedback and resistance from the NBA players forced the NBA and Spalding to return to the traditional leather ball only three months later.

Figure 4. New NBA Ball



Source: Birck, C. (2007). Remembering One of the NBA's Biggest Failed Experiments.. Retrieved October 2020 from <https://www.complex.com/sports/2017/04/new-ball-nba-spalding> screenshot by author.

### Case 7: Heinz Ketchup Bottle (non-sports)

#### Context and Challenge

Back in 2004, the New Yorker published an article written by Malcolm Gladwell in which he explained how food products like mustards or sauces could be exploited by the fact that humans enjoy variety (Gladwell, 2004). Consumers do not want just one spaghetti sauce, they want different spaghetti sauces as different consumers have different tastes. Thus, it makes sense for companies to offer a variety of spaghetti sauces in the supermarket shelves (Gladwell, 2020). And this does not only count for spaghetti sauces, but also for mustards and almost every other food product. However, in his article, Gladwell argues that there is one exception to this theory of variety: ketchup. More specifically: Heinz ketchup. Both consumers and food-science experts agree that Heinz ketchup cannot be improved as it perfectly stimulates all five tastes of the human palate: salty, sweet, sour, bitter and umami. And it does so in an equal measure. This ideal balance of each flavor is one of the reasons young children love ketchup. It is a familiar taste they can add to each dish (Carmody, 2012).

Heinz introduced this iconic product as one of its earliest offerings. Besides the perfect formula of ketchup, Heinz also thought they would have found the perfect glass bottle design packaging. Since its launch, it had stayed the same for more than a century and

the company had no plans for changing the design that perfectly fulfilled its function. However, in the 1980s, findings from a user research project made the company rethink its packaging design (Jewell, 2018).

Innovation Process

Heinz worked on an extensive market-research project that was about understanding how people consumed ketchup at home. Researchers visited family homes and observed how mom, dad and the kids consumed ketchup during dinner. One researcher explained: There was a three-year-old and a six-year-old, and what happened was that the kids asked for ketchup and mom brought it out. And the three-year-old went to grab it himself, and Mom intercepted the bottle and said, 'No, you're not going to do that.' She physically took the bottle away (Keller cited in Galdwell, 2004). Based on this and similar observations, researchers interviewed moms and dads and asked them specific questions about their behaviors. It turned out that parents considered the action of holding the glass ketchup bottle in one hand and banging the other end of the bottle with the other hand too dangerous for their children. For Heinz, this was an extremely important insight as kids consume 60% more ketchup than adults. Consequently, the biggest consumers of ketchup, kids, did not directly have access to the product as parents restricted its use due to the glass bottle packaging design. Therefore, the Heinz packaging design team started designing a new ketchup packaging bottle which would allow kids to control the ketchup consumption themselves. They changed the packaging material to a soft plastic which was much lighter. Furthermore, it was much easier to get the ketchup out of the bottle due to a conical nozzle. The new bottle proved a big success and ketchup consumption grew by 12%.

Figure 5. New Heinz Ketchup Bottle



Source: Iconic Packaging: Heinz Ketchup Bottle [Online Image]. The Packaging Company. Retrieved October 2020 from <https://www.thepackagingcompany.com/knowledge-sharing/iconic-packaging-heinz-ketchup-bottle/> screenshot by author.



In the following years, Heinz kept observing its users. In the late 90s, sales went down and the company wanted to understand why. User research identified that most users still had trouble getting the ketchup out of the bottle. When opening the bottle, very little ketchup got out in the first squeezes and the last bit of ketchup in the bottle was also hard to get squeezed out. To bypass this problem, consumers often positioned the bottles upside down in the fridge. Based on these user insights, the upside-down ketchup bottle was created. Again, the packaging design innovation was a big success. This can also be seen by the fact that today the majority of our daily products use the upside-down packaging design like toothpaste or shampoo (Greve, 2007).

### 2.1.3 Analysis and Discussion

The analyzed cases in this chapter underline the importance of **user research and user data** in the innovation process. Thereby, empathy, which means “the ability to understand and share the feelings of another” (Hernandez, 2019), plays a fundamental part in user research. Practicing empathy and doing in-depth user research means going out into the real world and talking to real users. It is crucial to immerse in the users' lives and remove our own point of view in order to learn about moments that delight users and things that keep them up at night.

The example of **Adidas** clearly shows how Adolf Dassler put himself in the users' shoes by assisting football trainings on a regular basis to empathize with the players and observe them in their day-to-day environment. His insistence to stay on the field also in bad weather conditions and talk to football players repeatedly ultimately led him to the final insight. The importance of immersion also comes across in the **FC Barcelona** and **Heinz** example. RealTrack Systems was re-located to the basketball court in order to work right next to the players and be able to interact with them in their real-life environment. Similarly, Heinz researchers did not conduct interviews on their premises but visited family homes to observe how parents and their kids consumed ketchup during dinner.

Hence, all three examples clearly highlight the importance of **observational research**. Observational research or ethnographic research is very powerful as it is based on actions and behaviors and not solely on conversations. Especially **Heinz** is good example of how observational research helps to explore important insights which would not have been anticipated before and would never have unveiled with interviews and focus groups only. However, interviews are still important to complement the data gained from the observational research. Observations help us understand what is going on and then interviews help us understand and interpret why users behave in a certain way. Thus, the insight regarding the Heinz ketchup bottle came from a combination and interplay of observing and interviewing right at the dinner table. Thereby, having the user in his/her day-to-day environment helps to recall more prompts.



Besides observations and interviews, there are many more user research methods and tools including digital ethnographic tools which may gain relevance in the light of COVID-19. For example, a camera or diary study can establish empathy remotely by having users record their activities and experiences in a diary, photos or videos.

Furthermore, the **use of quantitative data** in user research is getting more and more popular nowadays. For example, Amazon and Netflix both collect millions of data points to decide which TV show to produce next (Wernicke 2016). However, a comparison of the approach between the two companies shows that data can have its limits. While Amazon solely used data analysis in their decision to release the show “Alpha Show”, Netflix combined data and human brains to launch their show “House of Cards” which was much more successful. Amazon used data analysis for the whole process, contrary to Netflix, which used data analysis to take the problem apart and to analyze the little pieces of user information, but then used more qualitative aspects and individual user inputs to put the pieces together again and come to a conclusion. This example shows that **quantitative data combined with qualitative data** from observations and interviews is more powerful than data alone. Thus, qualitative user research should be integrated in every innovation process, especially in an industry like sports in which human and emotional aspects play a big role.

However, user research must be conducted with **the “right” user group**, otherwise it does not support the innovation process. In the previous chapter, we have seen the example of **FoxTrax**, which failed because there was no real user problem for hard-core hockey fans. Fox Sports actually thought that there was a user problem because they conducted user research with casual fans who reassured them that following the puck on TV was indeed a problem. Yet, it was not the casual fans who regularly watched hockey games on TV but above all the hard-core hockey fans who had no difficulty following the puck on the ice as they had learned how to track it. Similarly, the **NBA** example clearly points out that it cannot just be assumed that the insights from the research of one user base (i.e. players from lower leagues) can be transferred to other users as well (i.e. NBA players). Different user groups have different needs. In general, innovators and entrepreneurs should first focus on the user need of a small, well-defined user group (early adopters or extreme users) as this gives clearer insights into a user problem. Then, once the needs of this small group of extreme users are covered, the needs of other user groups (early majority or mainstream users) can be explored. This jump from one user group to another user group (“crossing-the-chasm”) and bringing innovations to a wider audience is often not trivial. Solutions must be adapted as the user needs of extreme users and mainstream users are often not the same. In sports, starting from extreme users might be more difficult as top leagues often act in a non-failure environment. Nonetheless, sports innovators must make sure that once a new solution gets to the top leagues, it does not surprise athletes and is useful for them.

To sum up, this chapter highlights the importance of user research, especially observational research in order to identify a real user problem for a well-defined user group. Quantitative data can give additional insights; however, it should always be



complemented with qualitative data. The next step is to clearly define the problem that will be discussed in the next chapter.



# Unit 2.2 Defining the Problem

## 2.2.1 Introduction and Overview - The Power of Defining and Reframing a Problem

The goal of this stage is to define a clear, human-centered, actionable problem statement. During the problem definition stage, more data about the users will be gathered to finally arrive at what the real problem is and what its root causes are. Thereby, the following three aspects should be clearly identified: what the problem is, what the reason of the problem is and what the specific user group is. Finally, the problem statement/challenge can be reframed by using a “How Might We” (HMW) question to unlock new solution spaces.

Table 2  
*Cases - Problem Definition*

Case	Name	Main stakeholder	Short description of main challenge
Case 5	RealTrack Systems	FC Barcelona (football)	Access more accurate data to monitor athletes' performance.
Case 8	FIFA Ball	FIFA (football)	Design a safer, fairer and more standardized ball.
Case 9	NFL Microsoft Surface Tablet	NFL (American football)	Introduce Microsoft Surface Tablets in NFL for a quicker game analysis.
Case 10	The beginnings of AirBnB	AirBnB (non-sports)	Offer affordable and transparent accommodation for travelers.

## 2.2.2 Cases

### Case 5: RealTrack Systems (continuation)

#### Context and Challenge

As explained in **Case 5**, the head of the physical trainers at FC Barcelona, Joan Ramon Tarrago, initiated a project aimed at introducing a performance tracking system that would combine outdoors GPS technologies and indoors radio-based technologies, and thus, deliver more accurate data about the athletes' performance across all disciplines and teams. But what was the actual user challenge and how did Joan Ramon Tarrago and his team frame the specific problem statements?

#### Innovation Process

The main user problem was that physical trainers had not yet understood the level of body stress of the players in training sessions as well as matches. Since they had difficulties getting accurate data for the external load of athletes' muscle activation on the field, they could not optimize the physical performance of the players based on their individual body



stress level. This represented a problem because, if physical trainers overdid with exercises, players were more prone to injuries, whereas if they underdid with exercises, players were not optimally prepared. Thus, the main user challenge was to optimize the physical strength of players based on more accurate and complete data.

Within this user challenge, the technical challenge was to capture the right data. The main problem with the existing tracking system of the football team, besides from the fact that it only worked properly outdoors, was that it consisted of a closed system. This made it hard to group data and make correlations with data from other sources in order to produce useful insights. For example, having access to data from the medical department would help physical trainers to design better trainings particularly for injured players. Moreover, the currently used tracking technology was a black box, as physical trainers could not access the raw data to check if the variables fulfilled FC Barcelona's expectations of reliability and accuracy. In general, manufacturers were not willing to share raw data and every manufacturer used its own method to process raw data before sending it to the clubs (WIMU, the device that tracks athlete data, 2020). Thus, Joan Ramon Tarrago and his team defined three main criteria for the new solution:

- 1) Synchronization between indoors and outdoors
- 2) Integration with other data sources (possibility to merge data sets)
- 3) Access to raw data

These three criteria built the basis for the subsequent technology selection, development and testing process. FC Barcelona started a collaboration with the startup RealTrack Systems (RTS) which was ready to co-develop and adapt their current technology to the specific needs of FC Barcelona. Over the course of two years, RTS together with the physical trainers developed different prototypes that were continuously tested and adapted based on user feedback until WimU was successfully introduced into the first team in 2017 (more details regarding the development, testing and implementation can be read in **Case 5**).

## **Case 8: FIFA Ball**

### Context and Challenge

Since 1970, FIFA has been using official match balls in the FIFA Football World Cups that take place every four years. For every World Cup, FIFA introduced a new ball that was slightly better from a performance perspective than the previous model. For over 50 years, FIFA has led this continuous innovation process in collaboration with its ball manufacturer Adidas. But what has been the main challenge and motivation behind the ongoing improvements of the FIFA ball?

### Innovation Process

The main user problem which FIFA identified was that, when it rained, the ball got heavier and heavier, which led to an increased physical stress in players and, eventually, injuries. Thus, the initial challenge consisted of making the ball waterproof so that it would be more



consistent and would not weight more at the end of the game than at the beginning of the game. It all started off with solving this specific problem of making the ball waterproof. However, in the process of solving this problem, the ball ended up changing and new problems appeared. For example, FIFA realized that the ball did not fly consistently in the air. Consequently, it was very difficult for players to predict the dynamics of the ball which heavily depended on outside conditions and the manufacturing process of the ball. This sometimes resulted in unfair practices. Thus, in the next innovation cycle, FIFA optimized the dynamics of the ball by defining common manufacturing standards (e.g. predefined materials, sewing methods, air pressure, etc.). Later, FIFA realized that it needed to be more consistent on the ground, or in hot/cold weather, etc.

Like this, they discovered more and more problems and also ways to make the ball more consistent. Hence, while working on the main problem that FIFA originally wanted to solve, other problems got uncovered by iterating and talking to different users. Overall, there have been many iterations in which FIFA basically tried to solve three main problems:

- 1) A health and safety issue for players
- 2) A fairness of play issue for teams
- 3) A user interface issue for players (e.g. no standard weight, ball dynamics, etc.)

All in all, FIFA was solving various problems for multiple users like players, clubs and spectators who shared the same pain point of an unsafe, unpredictable and unfair practice. This encouraged FIFA to follow their iterative innovation process to produce a safer, fairer and more standardized ball over the last 50 years. Their attempt to waterproof the ball and create a uniform ball for the World Cup is one of the first examples of agile innovation processes in sports based on a profound understanding of the core user problem.

## **Case 9: NFL Microsoft Surface Tablet**

### Context and Challenge

In 2013, Microsoft landed a five-year sponsorship deal with the National Football League (NFL) making it the official technology sponsor of the NFL. Microsoft paid the NFL \$400 million with the component being that the NFL used its Microsoft Surface Tablets as the “official tablet of the NFL” and implemented it as the new game analysis tool on the sidelines during the games (Gaines 2014). Up to then, NFL coaches on the sidelines relied on black-and-white instant printouts to analyze previous plays on the spot. Installed cameras in the stadium took pictures of the field and the positioning of the players during the game. Throughout the game, these pictures were then printed out on the sidelines, put into binders and handed over to coaches in a very efficient manner. The coaches would flip through the pictures, trying to determine the type of offence or defense the competition was playing. So, the coaches were relying on printouts transmitted via fiber optic cables and quickly assembled in binders by team “runners” who brought them to the coaches as fast as possible (Sideline of the Future, n.d.).



For 15 to 20 years, this system and technology worked very well. However, when Microsoft entered the sponsorship deal with the NFL in 2014, Microsoft Surface Tablets were supposed to replace the paper-based system. The new technology would analyze the game more quickly and in more detail by including functionalities to zoom-in, make annotations and tag favorite players for later review. Instead of printing out the pictures, it was all done digitally by sending the images from the cameras via the NFL servers directly to the surface tablets on the sidelines. Thus, the new technology would give coaches more immediate and dynamic options to analyze their opponents' strategy and tactics.

Figure 6. NFL Microsoft Surface Tablet



Source: NFL Microsoft Surface Tablet [Online Image]. The Verge Retrieved October 2020 from <https://www.theverge.com/2016/10/21/13359892/microsoft-surface-nfl-tablets-patriots-defense-screenshot> by author.

While many teams had positive experiences with the tablets, there was also plenty of negative feedback. In 2015, Aaron Rodgers, coach of the Green Bay Packers, slammed his tablet on the sidelines as he was not able to connect properly. Contrarily, the opponent team (Carolina Panthers) did not experience any connection problems (Green, 2016). Other coaches experiences similar scenarios. Nevertheless, the NFL decided to continue with the new technology due to the long-term sponsorship deal. Actually, it is still in use today and in March 2020, the NFL prolonged the partnership with Microsoft with the aim to further accelerate digital transformation in the NFL and increase efficiency through an enhanced communication and collaboration between coaches, players and other stakeholders via Microsoft Surface Tablets and other tools like Microsoft Teams (Microsoft and the NFL expand partnership to accelerate digital transformation across the League, 2020).

### Innovation Process

The innovation process was characterized by a lack of user research and problem understanding. The change from paper pictures to tablets was considered as natural evolution due to the fact that tablet technology had been available for more than a decade already. Although the old system might have been inefficient, it worked just fine. There was no real user problem as the paper-based printouts were fast, detailed and effective enough and did not imply pain points for neither the coaches as the main user group nor the players, referees or other NFL stakeholders. Instead of a user challenge, a technical challenge served as starting point to unfold the innovation process.

When the Microsoft Surface Tablet was introduced into the NFL, the team did not define the problem nor consult actual users. They rather pushed the new technology into the problem, which indicates the lack of a clear innovation process.

### **Case 10: The Beginnings of AirBnB (non-sports)**

#### Context and Challenge

In 2007, Brian Chesky and Joe Gebbia, the two co-founders of AirBnB, were living in San Francisco. They knew that a big design conference, the Industrial Design Conference, was going to take place in San Francisco and that it would be very difficult for participants as well as for other visitors to find accommodation. Actually, they were also struggling to pay rent themselves. Subsequently, Brian and Joe had the idea to turn their loft into a bed and breakfast by renting out air mattresses to people who could not find accommodation or just could not afford hotels. During the upcoming design conference, they rented out three mattresses to their very first three clients, each paying \$80. AirBnB was born (Ribbers, 2015).

#### Innovation Process

The starting point of the innovation process was a specific user problem which can be formulated as the following: during conferences and big events, it is extremely difficult for conference visitors or visitors in general (main user groups) to find an affordable accommodation in San Francisco as hotels are either booked out or ask for unreasonably high room rates. When AirBnB started, there were no technical challenges, as first assumptions (i.e. that conference visitors would be willing to rent an air mattress in a private studio) could easily be tested without big technology investments.

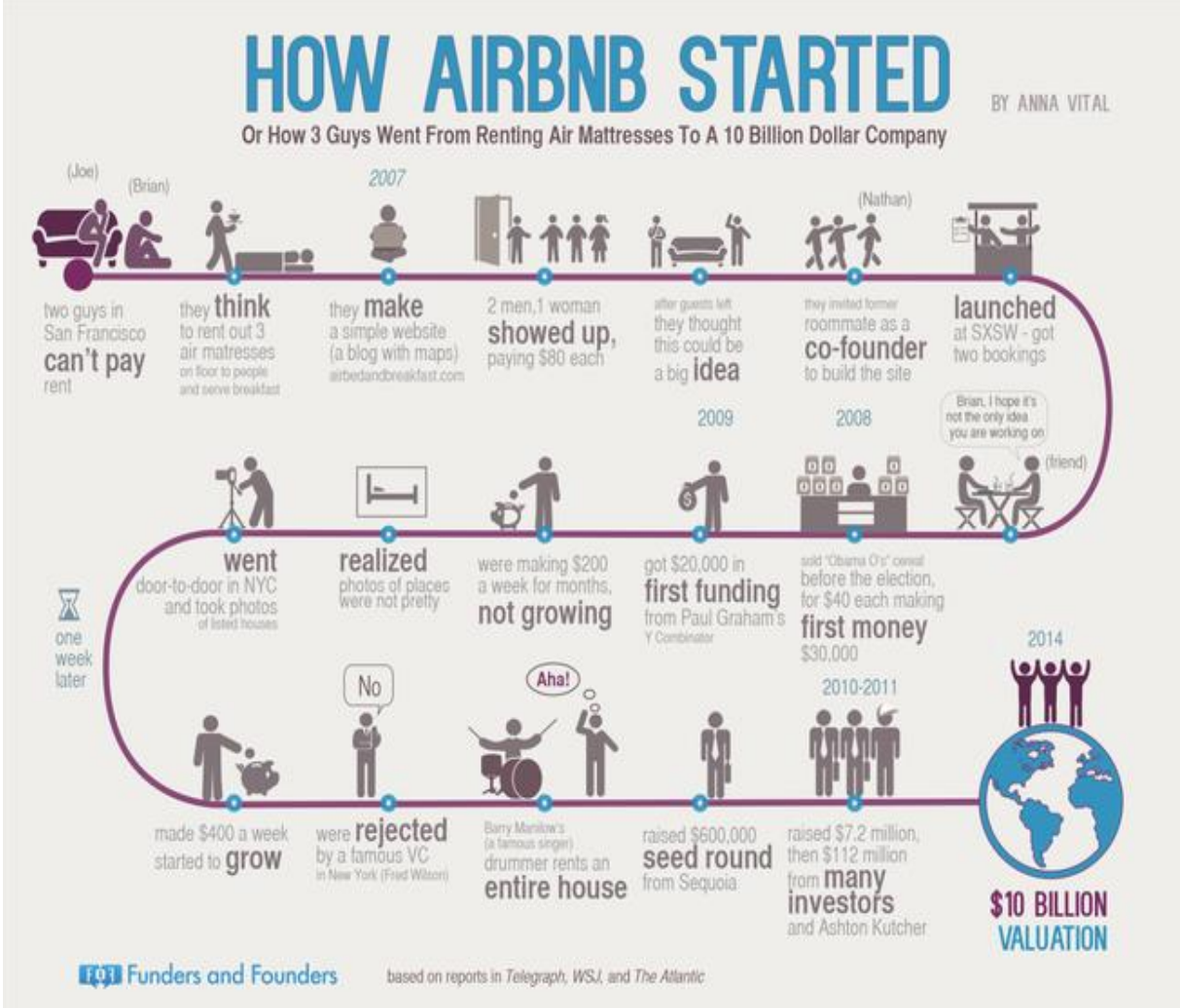
Brian and Joe created a simple website to attract their first three customers. Actually, at that point Brian and Joe did not think yet of starting a business. However, after their first guests left, they thought they should give their idea a try. Soon after, Nathan Blecharczyk joined the team as third co-founder. They initially launched but only received two bookings. Therefore, they changed the website and launched again in 2008. Although this time they received more bookings, the success was short-lived and AirBnB needed funding by all means. The founders even tested other ideas like selling "Obama O's" cereal



boxes and actually managed to make \$30,000. Then in 2009, AirBnB raised its first funding from Y Combinator. However, they still did not have many bookings and decided to travel to New York, their biggest market, to talk directly to their users and find out what the problem was. They discovered that the main problem was that the photos of most listings were not good enough (Aydin, 2019). Thus, they bought a camera and went door-to-door to take better pictures of the places. AirBnB finally started taking off and gaining some traction (Vital, 2020).

Brian, Joe and Nathan scaled the solution to many other types of users and contexts, way beyond conference participants and San Francisco visitors. They went from a rather specific How Might We (HMW) question (e.g. "How might we provide conference visitors with an affordable, convenient and transparent solution for accommodation in San Francisco?") to a broader HMW question (e.g. "How might we provide travelers with an affordable, convenient and transparent solution for accommodation?"). They suddenly realized how big their idea could be. As they say, the rest is history.

Figure 7. The Beginnings of AirBnB.



Source: Vital, A. Funders and Founders. Retrieved October 2020 from <https://airbnb370.wordpress.com/history-of-airbnb/> screenshot by author.



## 2.2.3 Analysis and Discussion

From the presented cases it becomes clear that innovation should always be based on a **user problem**. **FC Barcelona**, **FIFA** and **AirBnB** all started from a very clear user problem. The very first innovation project at **FC Barcelona** was initiated due to the problem of the physical trainers not getting enough accurate data to monitor athletes' performance. It was very difficult for physical trainers to optimize the physical performance of players as too many exercises would have risked injuries and too less an insufficient preparation. Similarly, **FIFA** started innovating on the ball because they realized that, when it rained, the ball got heavier during the game, which increased the physical stress of players and led to more injuries. So, their initial problem statement was to keep the weight of the ball consistent by making it waterproof. **AirBnB**, which has become a major disrupter in the hospitality industry, also started from a very specific, simple user problem - the lack of accommodation options in San Francisco during conferences.

While the innovation processes in these three examples unfolded from a clear user problem and reason "why", the introduction of the Microsoft Surface Tablets in the **NFL** was not based on a real user problem but rather on the business opportunity of the sponsorship deal and the desire to push the new technology into the market. There were two issues regarding the innovation process. First, the NFL did not explore the problem space and thus, did not define the problem. Second, there was a clear lack of user empathy as NFL coaches and players were not consulted and kept outside the loop while marketing people and other people involved in the sponsorship deal took decisions on their behalf. This example illustrates how sponsorship deals can force new solutions onto sports that are created and implemented top-down and forget to involve the actual users in the innovation process. Similar cases can be seen in the **NBA** and **FoxTrax** example in the previous chapters where innovations failed because there was simply no real user problem.

Thus, successful innovations come from a good understanding of a specific and narrow user problem rather than high-level challenges or new technologies that are pushed into a problem. Although starting from a specific user-related problem is fundamental, challenges and **problems of other stakeholders** can be added and solved later on. Especially in sports, this might be a critical factor as in this sector many different stakeholders like business, governmental and social actors are involved and usually the "buy-in" from various stakeholders is needed for an innovation to get accepted. The **FC Barcelona** example nicely illustrates that over time other stakeholders should be involved in the innovation process as well with the aim to solve problems for them too. The physical trainers as the main users initiated the project because they were experiencing a severe pain point themselves. By defining the problem and searching for possible solutions they realized that a standardized system across all disciplines and teams would actually benefit the whole club. So, the physical trainers started solving problems (e.g. no access to raw data, no possibility to merge datasets and synchronize between indoors and



outdoors) not only for themselves but also for the club and other stakeholders like medical doctors.

In general, problems always have several aspects and can **evolve over time**. Also the **FIFA** and **AirBnB** examples show quite well that this process of problem definition is not linear. **FIFA** started solving the problem of making the ball waterproof with the aim of having the same ball weight at the end of the game as in the beginning of the game. Once they had this problem solved, they realized that the way the ball flew in the air was not consistent and led to unfair practices. Thus, they then improved the dynamics of the ball. While innovating and iterating they discovered many more problems and redefined their problem statements. Also **AirBnB** started from one very specific user problem but then over time solved new problems that emerged along the way. For example, they discovered that the reason why the booking rate remained so low was that the pictures of the places were not good enough. The whole process of developing **AirBnB** nicely illustrates how innovation is a process of identifying and solving problems over time.

Furthermore, both **FIFA** and **AirBnB** went from solving a rather narrow user problem to a much broader problem. While **FIFA** started from the problem of making the ball waterproof and ended up with the problem of improving the overall consistency of the ball, **AirBnB** started serving conference visitors in San Francisco and then slowly extended their problem definition to the whole travel and hospitality industry. So, besides adapting problem statements or pivoting to new problems over time, the extension of the problem definition to a broader use case or user group after initial successes is very important as this is the only way in which design thinking can become scalable.

To conclude, besides the emergent understanding of the problem, this chapter highlights the importance of solving a real user problem and starting innovation processes from a well-defined problem for a specific user group but then, over time, widen up to a broader problem definition and include problems of other stakeholders as well.



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