

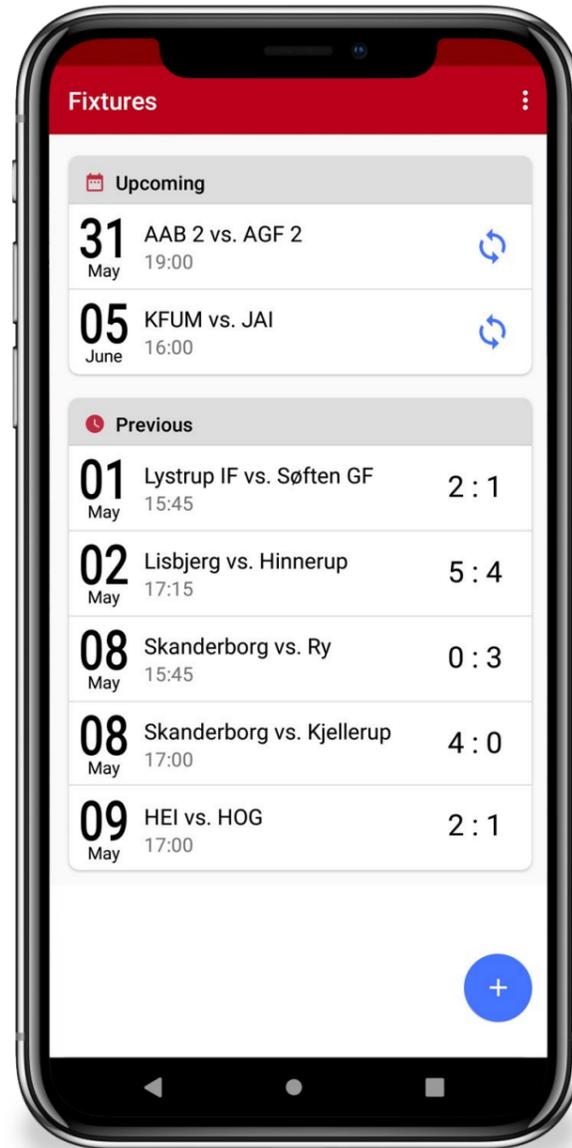
SportsLevels

MASTER THESIS

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Supervisor: Claus Andreas Foss Rosenstand
Period: February 2018 - June 2018
Submission date: 01.06.2018
Number of pages: 149





Welcome to SportsLevels

A journey from an idea to a business

We, Monika, Sebastian, and Rimon, three students of the master's program "Entrepreneurial Engineering" would like to introduce you to our start-up "SportsLevels", which we founded in 2016 at the beginning of our master's program.

The idea was to develop an app for smart-watches that helps referees to capture relevant data during a football match digitally rather than using pen and paper.

In the meantime we are at the end of our master's program and as part of our master's thesis we present the journey of "SportsLevels" from a founding idea to a proof of concept.



The Team



Monika Michelsen



Sebastian Bille



Rimon Nassory

The master thesis team around SportsLevels consists of three Entrepreneurial Engineering students from Aalborg University. Monika, Sebastian, and Rimon have different educational and cultural backgrounds but share a common passion for entrepreneurship. The interdisciplinarity of the team helps to consider the project from several perspectives and to complement each other.

I grew up in a small town in Slovakia. When I was 19, I faced maybe the toughest and the most exciting decision in my life. I had to decide if I want to accept or decline a study offer from a university in Denmark. Since I have been writing this master thesis, you can probably figure out what happened. I decided to go for the adventure and it completely transformed my life. In 2011 I moved to Aalborg and started The Design, Technology and Business (Graphics) program at UCN, and followed it up with Digital Concept Development top-up. Then I thought that design will not be enough for the future, so I picked up AAU master program Entrepreneurial Engineering in which I met Sebastian and Rimon. They invited me to join forces and work on RefLevel product, the game management app for football referees. As part of this team, I offer sharp goal-oriented thinking, an eye for design, and I act on knowledge I leverage from a lot of interesting books.

I am a passionate engineer and entrepreneur who is enthusiastic about innovation. It inspires me to approach constraints from different perspectives: What is functionally possible in the foreseeable future? What is likely to become part of a sustainable business model? What makes sense to people and for people?

It motivates me to work in interdisciplinary and cross-cultural teams. One of my strengths is to keep calm when situations become hectic and I see things objectively and analyse them before taking decisions.

I have a bachelor's degree in mechanical engineering (RWTH Aachen) and worked 3+ years in the fiber composite industry.

As a sports enthusiast and a football referee in my spare time, working with SportsLevels and being a co-founder is the absolute dream come true. Combining my bachelor's degree in programming and my master's degree in entrepreneurial engineering helped me start on creating the software service back in 2016. My bachelor's degree is in Information Communication Technology Engineering (ICT-Engineering) from VIA University College in Horsens Denmark, which creates a broad understanding of how nowadays different programming languages are used, while communicating with companies was part of the learning as well. Having this skill of programming makes you create your own ideas without having the knowledge of how to create your own business, but Entrepreneurial engineering helped me to overcome this burden.



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1 SPORTSLEVELS

CHAPTER IN BRIEF

Chapter 1 is divided into four parts. The first part tells the story of the start-up company SportsLevels IVS and its product RefLevel. The second part defines Game Management for Football Referees. The last two parts deal with the concept of Engaged Scholarship and present the research and publication design.



Figure 1: SportsLevels & RefLevel logos

1.1 SportsLevels' History

SportsLevels started in 2016 as a small idea generation exercise during the first semester of Aalborg University's master program Entrepreneurial Engineering (EE) in a course called Creativity Workshop. The course was about creative methods and idea generation, and to build upon ideas instead of killing them. The process of creating ideas was to sit in front of a wall with closed eyes and think about situations from the past, which might have caused problems. During the first semester, Rimon Nassory together with his group tried to look into the idea of creating a software service for foot-

ball referees through smart watches. After some research, the group found out that they have a competitor in their early stage, and the rest of the group lost interest in the idea of creating a football service for football referees.

In contrast to the first semester in which groups were pre-made, the second semester (spring 2017) of EE made it possible to start working on SportsLevels. During the second semester, Rimon Nassory and Andrius Baliuvaticius started working on the idea. They wanted to validate if the idea

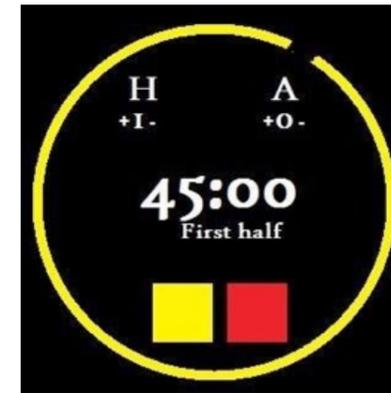


Figure 2: RefLevel Design 1

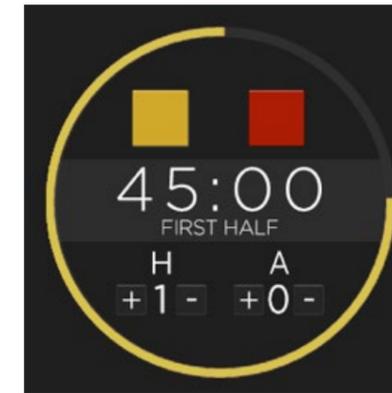


Figure 3: RefLevel Design 2



Figure 4: RefLevel Design 3

resonated with referees and if they should continue with the project.

The first thing was to find out that line referee Jakob Bille who is also a FIFA referee, is head of the grassroots referees in Denmark and head of the administration in Jutland. Rimon and Andrius contacted him and setup a meeting in Aarhus at DBU's headquarter in Jutland to discuss the idea. At that time, they used a software tool called Android Studio to run a simulation and demonstrate how RefLevel would look like on a real watch. The meeting ended with positive feedback and Jakob Bille suggested to contact another elite and FIFA referee Mads-Kristoffer Kristoffersen (Figure 5), who is fan of technology and uses a lot of tools to improve his performance. As a result of the meeting with Jakob Bille Rimon and Andrius changed the solution a bit and bought their first smart watch, a "Sony smartwatch 3". Finally, they could start programming and see how the software actually looks like on a real smart watch. The three images (Figure 2, Figure 3, Figure 4) above show an early version of the user interface (UI). Rimon and Andrius quickly found out that the UI needs to be improved.

After the meeting with Jakob Bille they contacted Mads-Kristoffer Kristoffersen to setup a meeting with him. From Jacob Bille's meeting they found out that reporting back to DBU could have been done better than today. Bille explained that today reporting is done manually after each match to

DBU, and he could see the potential of RefLevel if all match recording could automatically be reported back to DBU. Reporting back to DBU was one of the things Rimon and Andrius wanted to work on, but another thing they wanted to validate was the performance improvement program in Denmark. They wanted to know how it works and if anything could be improved. The meeting with Mads-Kristoffer was very positive and they got some good input about how the performance program works and if anything could be improved. Before the meeting they made some design changes to RefLevel, so it looked like RefLevel design (Figure 6).

Afterwards, Rimon and Andrius took the comments from both referees and started to program. Meanwhile, they contacted some grassroots referees who could be interested in trying out the solution in a real match, and three users were found as shown in Figure 7, Figure 8, and Figure 9.



Figure 5: Mads-Kristoffer Kristoffersen

From each user-test they got good feedback, which was used to iteratively improve the solution.

In June 2017 was the first meeting with DBU to show them RefLevel and see if they were interested. SportsLevels wanted to get the data about referees and players from DBU, so SportsLevels could offer an automatic solution. The meeting went well, and SportsLevels was told to keep developing the solution, and meanwhile DBU would



Figure 6: RefLevel design 4



Figure 7: User-test 1



Figure 8: User-test 2



Figure 9: User-test 3

In the end of the second semester and the beginning of third semester, the third co-founder Sebastian Bille joined SportsLevels as the COO and graphic designer. After Sebastian Bille joined,

SportsLevels got accepted in the AAU Incubator and the UI of the app changed as shown in Figure 10. Once again, SportsLevels sent the newly developed application to DBU for testing.

In September 2017 the company SportsLevels IVS was founded by Rimon Nassory, Sebastian Bille, and Andrius Baliuvaticius. In this month, SportsLevels started to outsource the Android development to an Ukrainian developer called Bogdan and it became apparent that he is very skilled.

In December 2017 SportsLevels released the application for the first time and it resulted in a couple of downloads.

Through the Google Play Console it was possible to monitor App crashes and the devices it happened on. Google Play Console also shows from which countries users come.

In the end of third semester and beginning of fourth semester (early 2018), Andrius Baliuvaticius decided to leave SportsLevels and work on music, which was more his passion than sports. This left Sebastian Bille and Rimon Nassory to be the only co-founders of SportsLevels.

SportsLevels had another meeting with DBU in January 2018. The goal was to negotiate connection to their API, in order to access information about referees and football players. This is important to automate RefLevel instead of relying on manual inputting. At the meeting we got some new information and we were told that there are political decisions to be made before RefLevel can be used. Specifically, there is a committee called FLU, which is one of the two formal members of



Figure 10: RefLevel design 4

DBU and in charge of football as a sport for the masses. We needed their approval if we wanted to have RefLevel used during football matches in Denmark. If we could get the approval, then we could also get access to DBU's API. We asked them why it is important to get FLU's approval. The answer was, that it might cause problems if a referee developer needs to evaluate a referee in a match and sees that he is using RefLevel without his knowledge. Therefore, it is important to get approval in order to avoid misunderstandings and rejections. We were told that Morten Rask Tomsen is the head of FLU and lives in Aarhus. Before the DBU meeting we actually already contacted Morten Rask, because we wanted access to Aarhus football referees Facebook group to get some user-tests.

From the beginning of fourth semester (February 2018) Monika Michelsen joined SportsLevels and amongst many other tasks became in charge of the graphic design, so Sebastian Bille could focus more on the day to day business of SportsLevels.

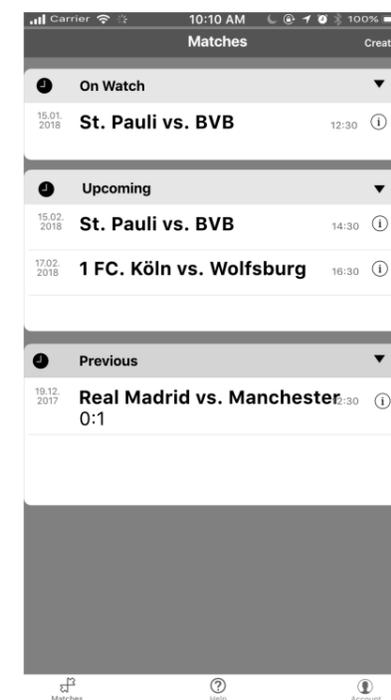


Figure 11: RefLevel phone mock-up

Before we met Morten Rask to get the approval, we wanted to create a mobile version which we can synchronize between the mobile phone and the watch. On the mobile we wanted to create a match with the team names, player names, and the required options for the match. Monika Michelsen

designed the mobile version and Bogdan developed the design and the features we wanted to implement. A mock-up of the phone can be seen in Figure 11.

From January till March 2018 we designed the mobile application and made several user-tests before the meeting with Morten Rask in March. We met in late March with him in Aarhus, where we showed him the application and talked about RefLevel and how we want to help the referees. The meeting went very well, and we got positive feedback. He told us that we should convince the rest of the committee in a meeting taking place the 17th April 2018 in Copenhagen.

In March Sebastian Bille and Rimon Nassory decided to invite their external developer from Ukraine to join them in Aalborg for one month to speed up the development. In 4th April 2018 Bogdan joined SportsLevels in Denmark and at the 10th of April we finally released our application RefLevel as a beta version. The 17th of April we went for the meeting with FLU. The 4th of May we got the approval from FLU and we were contacted by DBU about that they also got the written email confirming that RefLevel is allowed to be used in Danish football matches for grassroots referees.

1.2 SportsLevels, RefLevel, and Game Management

The start-up company SportsLevels IVS develops RefLevel, which is Game Management software for football referees. RefLevel runs on smart-watches as the primary input-output devices and is thus a replacement for traditional refereeing tools such as pen & paper, classic watches and purpose specific fitness trackers. Furthermore, the computing and internet capabilities of smart-watches enhance refereeing with features such as smart card booking, automatic retrieval, and reporting of match relevant information. These features are elaborated in chapter 2, WQ I (p. 26 - 27).

A referee goes through a journey starting days before the match and lasting until the match is finished and reported. The sequence of tasks the referee has to execute is what we define as Game Management for football referees. Game Management for football referees covers all control activities (control = administration, supervision, and regulation) a (main) referee executes before, during and after a football match. These activities can be broken down as follows:

Before a match, Game Management for football referees comprises getting information about the match (date, location), the participating teams (team names, player lists, and coaches), substitution players and match specific rules (duration, period of validity of yellow cards, decision making if equal goals after end of match time).

During a match, Game Management for football referees includes checks before kick-off (number of players, goals, corner flags, and ball), picking a kick-off team, recording incidents during the match (substitutions, goals, yellow and red cards) and tracking the performance of a referee.

After a match, Game Management for football referees consists of reporting red cards or all incidents during a match. Furthermore, reviewing body performance (heartbeat, calories, etc.) and reviewing strategical performance (running patterns, positioning) is part of our definition of game management.

BEFORE

- Date, Location
- The participating teams
- Substitution players
- Game specific rules

DURING

- Checks
- Picking kickoff team
- Recording incidents
- Performance tracking

AFTER

- Reporting red cards (Lower league)
- Reporting all incidents (Higher league)
- Reviewing performance & strategy



1.3 Research Design

We used the Engaged Scholarship approach described in an essay by (Mathiassen, 2017) to manage the process moving from a real-world problem to our research publication. The core commitment of Engaged Scholarship is to bridge the theory-practice gap and thus it affords us the opportunity to contribute to practical problem solving while also developing new theoretical insights. In this process, a defining characteristic of Engaged Scholarship is to draw on perspectives and understandings of key stakeholders in a real-world problem situation. Furthermore, Engaged Scholarship is “a creative process in which researchers discover and evaluate different ways to frame and publish their research by iteratively collecting and interpreting knowledge and evidence, exploring and testing ideas, and discovering and evaluating alternatives” (Fisk et al., 2014 in Mathiassen, 2017, p.2).

The generic structure of Engaged Scholarship is illustrated in Figure 12. The real-world problem (P) and the area of concern (A) are related and form the basis on which the research question (RQ) is formulated. The research process to address the research question contains collecting data (DC) and analysing data (DA). The method of inquiry (M) determines the way data is collected and the

theoretical frame (F_A and F_I) determines the way data is analysed. F_A is a theoretical frame related to area of interest (A) and F_I is a theoretical frame independent of area of interest (A). Finally, the process leads to a contribution (C) to (P) and (A) and possibly also to (M) and (F_A) and (F_I).

AREA OF INTEREST (A) AND REAL-WORLD PROBLEM (P)

Referring to the generic structure of Engaged Scholarship, the area of interest (A) unfolded in this report is Game Management primarily for football referees and secondary for other football interest groups. We have investigated the real-world problem (P) for SportsLevels to provide football referees with a digital game management tool which, in comparison to conventional tools, gets the job done more convenient (smarter and faster) and under all weather conditions. Furthermore, we have studied the opportunity to incubate from the football referee game management niche market to the global mainstream market for football game management. In chapter 4 we will elaborate why SportsLevels is constrained to the football market and whether this is going to change in the future.

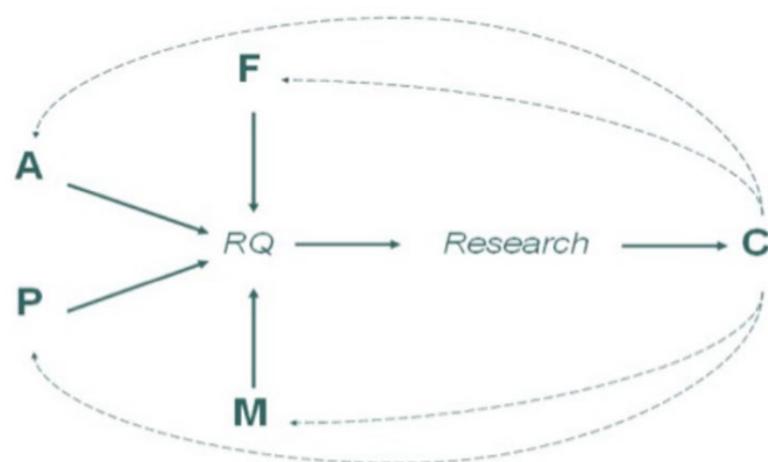


Figure 12: The generic structure of Engaged Scholarship

RESEARCH QUESTION (RQ)

Based on SportsLevels' real-world problem and football Game Management as the related area of interest, the following Research Question (RQ) is raised:

- How to organize SportsLevels and create a sustainable business model for RefLevel in order to establish a customer base as a fundament to benefit from the exponential price performance development of wearable disruptive technologies?
- And how to develop a business model for the niche market of Game Management for football refereeing and how to get on an exponential market trajectory towards a mainstream market position in football Game Management?

METHODS (M) AND FRAMING (F_A AND F_I)

Addressing the research question requires a mixed set of methods (M) to collect and analyse data about the real-world problem (P): Empirical approaches (interviews, focus group observations, technical tests) as well as evaluating statistics (collecting sensor data and usage data) cause a need for different methods to get valid insights. To this point the methodology is eclectic.

F_A : In relation to the area of interest, the research problem is primarily framed with the structures presented in the official “DBU’s Love” (statute of the Danish Football Union) (p. 22) and information found on DBU’s website and in DBU’s newsletters dealing with concepts of football Game Management.

F_I : Furthermore, the theory of disruptive innovation and the concept of exponential organizational growth as well as lean methods are chosen to frame the research independent of football game management.

1.4 Publication Design

The research process is problem oriented and hermeneutic. To structure the research process, the RQ was broken down into three sections:

1. Theory,
2. Methods
3. And practice

This order results from the fact that the practice depends on the chosen methods and that the chosen methods depend on the theoretical framing of the RQ. Each of the three sections contains related work questions (WQ). Working with the WQs in each section has changed them and since the RQ and the WQs are interdependent, changing a WQ has also affected the RQ. In practice, the final research design presented here is the result of a highly agile, iterative process. Based on the interdependence between the research design and the publication design (Figure 13), the following publication design is presented in this report:

Theory

Chapter 2, “Information in Game Management and Disruptive Innovation” elaborates the theoretical framing to address the research question and is divided in two work questions WQ 1 and WQ 2. The research method for both WQs is an evaluative literature review.

WQ 1 “Which information can Game Management for football refereeing generate and to whom is it relevant?” deals with how the flow of information relevant to Danish football referees is organized and is therefore the framing F_A related to our area of concern. WQ1 uses the official “DBU’s Love” (statute of the Danish Football Union) and information found on DBU’s website and in DBU’s newsletters as a primary source for information. WQ 2 “How can the theories of disruptive innovation help to form SportsLevels’ strategy?” discusses disruptive innovation theories and hence creates the framing F_1 independent of football

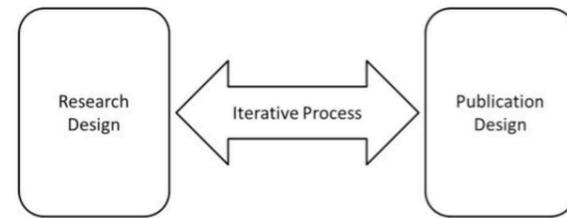


Figure 13: Interdependence between the research design and the publication design (Mathiassen, 2017)

game management. WQ 2 uses literature from Clayton Christensen, Rebecca Henderson, Joshua Gans, and Kenneth Arrow (Christensen C. M., 2015), (Gans, 2016), (Henderson & Clark, 1990) (Arrow, 1962) as primary sources.

The preparation of the first two work questions reveals the interfaces that RefLevel’s information processing can connect to and how a promising path for a start-up with fewer resources can look like. Together, this forms the framework in which the remainder of this master thesis moves.

Methods

After explaining what a start-up company with fewer resources can do in the context of information in football game management, the next chapter deals with the question of how this can be achieved. Chapter 3 “The ExO SportsLevels” thus shifts from a theoretical point of view to work and organizational methodology. Following the steps in which a start-up company like SportsLevels naturally grows, WQ 3 introduces the lean start-up methods, that is how to build minimum viable products and to establish a customer base. Afterwards, WQ 4 examines organizational characteristics as a way to follow the exponential path of wearable disruptive technologies.

WQ 3 “How to implement the Lean Principles in SportsLevels” is primarily framed by Eric Ries (Ries, 2011) and presents concepts such as build-measure-learn loops, business metrics and the power of small batches.

WQ 4 “What are the characteristics of an ExO (Exponential Organization) and how to implement these characteristics in SportsLevels” is about the concept of exponential organizations and areas in which SportsLevels already possesses the characteristics of an ExO, areas where work needs to be done, and areas where there is an unexploited opportunity for SportsLevels. WQ 4 is framed by Salim Ismail’s concept of exponential organizations (Ismail, 2014).

Practice

Chapter 4 is separated in 3 WQs. To answer the first work question WQ 5 “How to identify the elements of a Business Model using RefLevel as an example” the Business Models of Alexander Osterwalder and Clayton M. Christensen (Pigneur, 2010), (Christensen C. M., 2015) are explained and the building blocks used as a guide through the chapter. Step by step, from value proposition over revenue streams to partnerships, it is shown how the different business aspects around the software service RefLevel are implemented in practice. A mixed set of methods (interviews, focus group observations, technical tests) is used to gather and analyse data.

Since the beforementioned business models only focus on the internal parts of a company, WQ 5a “Who are the main stakeholders of the business value network around RefLevel and how do we connect them to leverage from this?” focuses on external parts of SportsLevel’s business.

Finally, WQ 6 “Which external factors and market uncertainties exist?” discusses a broader perspective on Game Management for football refereeing.

2 INFORMATION & DISRUPTION

CHAPTER IN BRIEF

The 2nd chapter elaborates the theoretical framing of this master thesis by pointing out the information flow in football game management in Denmark based on the regulations of the Danish Football Union. Afterwards, on the basis of literature sources, the “history” of disruption theories is described, and demand side disruption, supply side disruption, and the replacement effect are presented as three main theories of disruption.

2.1 Information in Game Management for football refereeing

The following subchapter 2.1 deals with WQ 1 “Which information can Game Management for football refereeing generate and to whom is it relevant?”. The chapter is primarily framed by DBU’s statute called “DBU Love” for two reasons. For one, DBU’s statute is not only a primary source but also legally binding for DBU’s organizational structure. On the other hand, our research has shown that, with the exception of a few newspaper articles, there is little secondary literature on the subject.

ORGANIZATION OF THE DANISH FOOTBALL SYSTEM

The Danish Football Association (Danish = “Dansk Boldspil-Union”; DBU) was founded in 1889, making it one of the oldest football associations in the world. The Copenhagen based, non-profit organization takes care of the organization of the Danish football system and represents Danish football both nationally and internationally. Thus, DBU organizes all national and international football matches for Danish teams and is member of the International Football Association (FIFA), the European Football Association (UEFA), and Denmark’s Idræts-Forbund (DIF). DBU maintains the Danish football rules and ensures that they comply with FIFA and UEFA rules. (DBU, www.dbu.dk, 2018) DBU has two formal members, which are

- The Association of Division Clubs in Denmark (Danish= “Foreningen af Divisionsklubber i Danmark”; Other names = “Divisionsforeningen”, “DF”, “FDD”) and
- The Association of Local Unions in Denmark (Danish = “Foreningen af Lokalunioner i Danmark”; FLU).

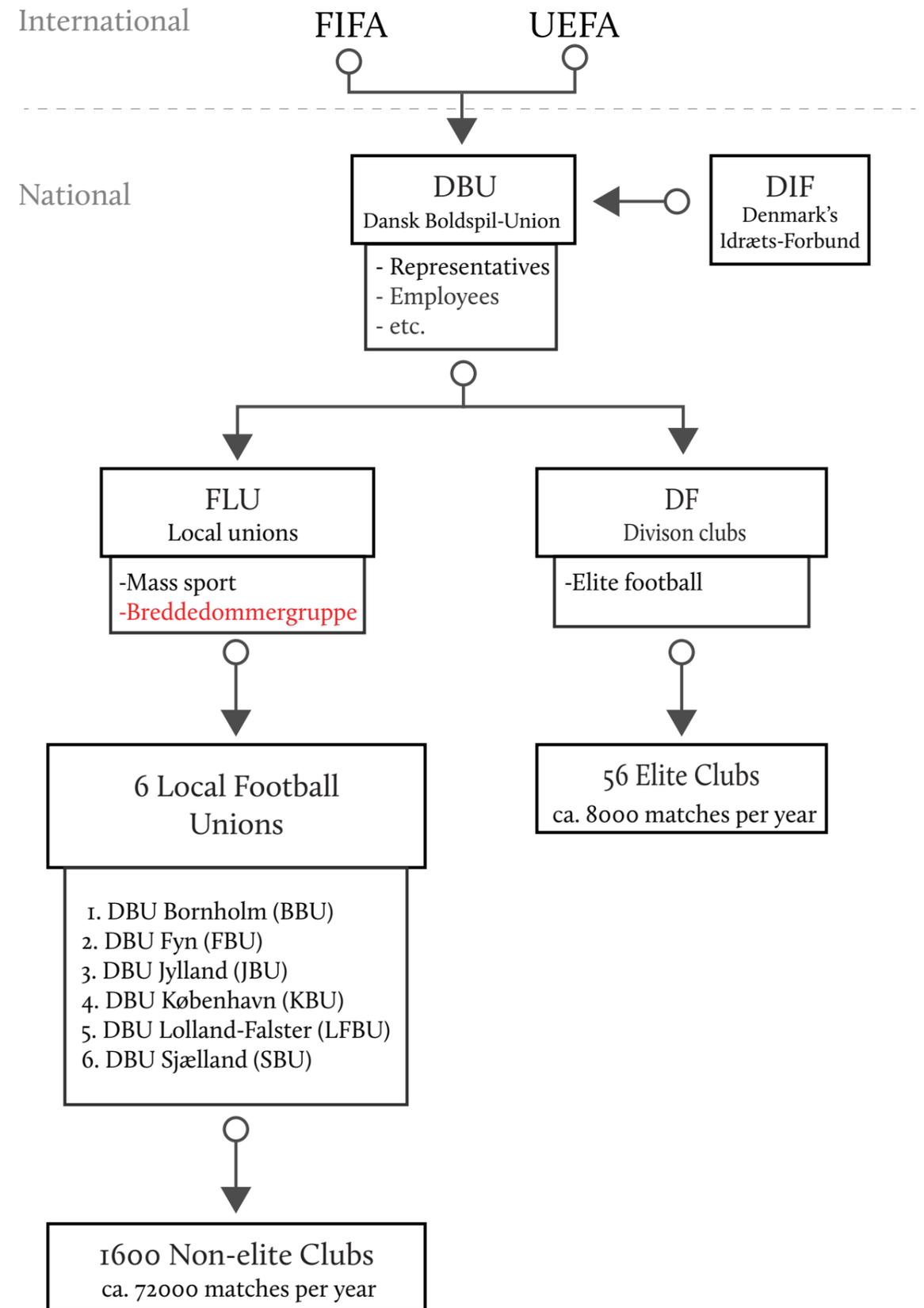
Divisionsforeningen represents elite football in Denmark and is the organization for the 56 football clubs that play in the top three Danish Tournament (“Superligaen”, “NordicBet Ligaen”, and

“2. division Øst og Vest”). Furthermore, it conducts the national football tournaments which DBU announces. (Wikipedia 1a, 2017)

FLU represents football in Denmark as a sport for the masses and is the interest organization for the six independent local football unions consisting of approximately 1600 football clubs:

- DBU Bornholm (Bornholms Boldspil-Union, BBU)
- DBU Fyn (Fyns Boldspil-Union, FBU)
- DBU Jylland (Jydsk Boldspil-Union, JBU)
- DBU København (Københavns Boldspil-Union, KBU)
- DBU Lolland-Falster (Lolland-Falsters Boldspil-Union, LFBU)
- DBU Sjælland (Sjællands Boldspil-Union, SBU) (Wikipedia 1b, 2017)

DBU has a Representative Board which consists of 146 representatives and is the highest authority of DBU and its decisions are final. The Representative Board consists of representatives of Divisionsforeningen and FLU and the associated clubs, which can send direct representatives. However, DBU employees cannot have seats in the board of representatives. The local unions have the possibility to apply for rules for their area of responsibility, which are not in accordance with the common rules. This must be approved by the DBU Board. Since this possibility is also used in practice, this has direct implications for the software service RefLevel (DBU, www.dbu.dk, 2018). The organization of the Danish football system is summarized in the figure below. The “Brededommergruppe” which is part of the FLU is highlighted with red colour, because this is the committee to which we were presenting our concept in order to get green light for an IT cooperation with DBU. This is discussed in detail in chapter 4, WQ 5a.



DBU'S FOOTBALL GAME MANAGEMENT IT SYSTEM

After pointing out how football in Denmark is organized, as the next step we illustrate the information flow in Danish football. Similar to organizational tasks, DBU is also the central administrative body for data in the Danish football game management system. DBU and the local unions have their own internal IT-system and together offer five external IT systems for clubs and individuals. All these systems are interconnected.

For football clubs, DBU offers two systems called "Klub Office" and "Klub CMS". The price for "Klub Office" is included in the annual IT fee which Danish football clubs have to pay. It is used to administrate club members and finances internally, including the option of online payment and automatic deduction. Moreover, it connects to DBU in order to approve or request player certificates, to create matches and order referees, to report results, to ensure correct club and personal information, as well as to create big and small competitions.

The content management system Klub CMS is available in two versions. One version is limited to receiving raw data from DBU (fixtures, standings, and results), costs 2475 DKK per year and is aimed at football clubs that have the expertise to develop their own software solution. The other version costs 3690 DKK per year and offers a dynamic and user-friendly website system. Both versions offer full integration to DBU's other systems.

On an individual level, DBU's IT-offering includes "Fodbold", "KampKlar", and "Livescore". "Fodbold" is the free iPhone/Android app that everybody involved in Danish football uses. The app offers extensive functionality, among the most important features are viewing fixtures, standings, and results for all competitions in Denmark, receiving club information, DBU news, and a collection of football game management tools for players, coaches, referees, referee developers, etc. The work flow relevant for referees is described in chapter

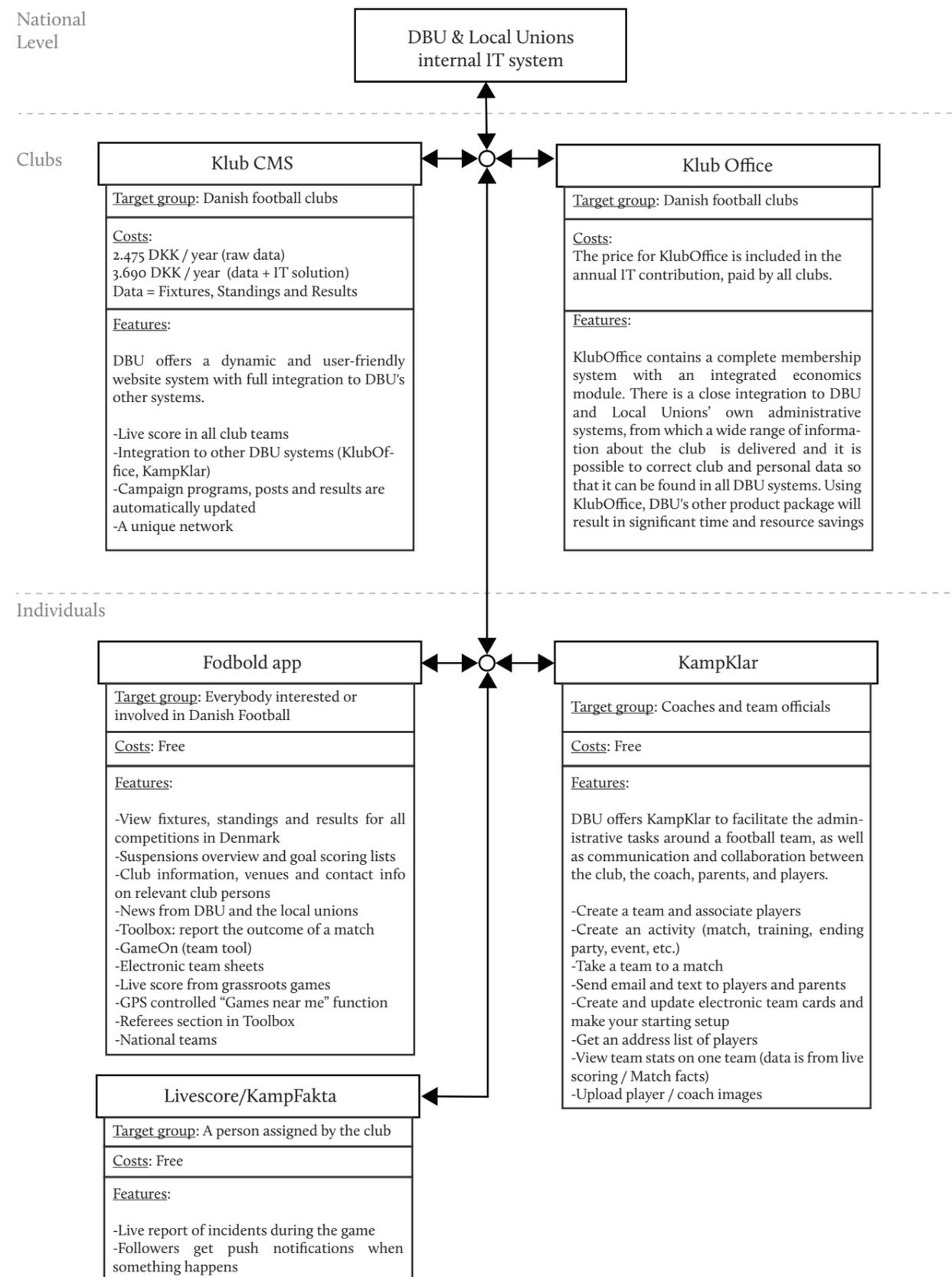
4.1 (WQ 5a).

"KampKlar" is DBU's free game management tool for coaches and team officials. It is used to create a team and associate players, to create an activity which can be a match or a training, but also not football related events like an ending party. KampKlar can be used to take a team to a match, send emails and text to players and parents, create and update electronic team cards, make a starting setup, get address lists of players, view team stats (data is from Livescore / KampFakta), and upload player / coach images to just name a few features. Like all DBU IT-offers, KampKlar is fully integrated in the other football IT solutions.

Last but not least, DBU offers "Livescore" or "KampFakta" which are both tools to report match results. As the names suggest, the difference between these tools is that "Livescore" is used to report match results in real time whereas "KampFakta" is used to report match results after the match. To ensure the reported live data is valid, a person which can be a team leader, a parent, or a third person must be selected for this job in KlubOffice. When Livescore is used, the final statistics are available on the web / app as soon as the match is finished.

Alternatively, if the match was not reported live "KampFakta" can be used, which offers the same functionality as "Livescore" just after the match. "KampFakta" can be accessed via the DBU website as a part of "KampKlar" or the "Fodbold" app.

(DBU, it-tilbud, 2018)



GAME MANAGEMENT FOR FOOTBALL REFEREEING

We have shown how football is organized in Denmark and what the structure of DBU's football game management system looks like. A definition of game management for football refereeing as the sequence of tasks a referee has to execute before, during, and after the match was already anticipated in Chapter 1.2. It gave the reader an easy introduction to the subject and the term was used in the research and publication design in chapters 1.3 and 1.4. In this chapter, we will take a closer look at electronic data processing solutions for referees. As mentioned before, a distinction is made between football as sport for the masses and football as an elite sport, which also applies to referees. The IT-systems and the way information are handled is the same for both groups, but for us football as a Sport for the masses is the more interesting target group. This is partly because there are many more referees in the lower leagues than in the elite league. More important, elite referees have access to very good and expensive tools. For example, there is always an entire referee team that is connected via Bluetooth headsets, the match is recorded on video, and there are referee coaches at their disposal that control the performance of elite referees. In contrast, referees in the lower leagues are on their own and have little equipment available to support them in their sport. Last but not least, elaborating WQ2 will show that there is a dynamic in capitalism that drives products up-market that have gained a foothold in the low end of the market. This effect can be so powerful that incumbents cannot defend themselves. It's often harder to go the other way around. For these reasons, the following chapter will focus mainly on refereeing as a mass sport.

Before the match. When a new football match takes place, DBU will assign a referee to this match in advance. The referee then gets notified by email and can open DBU's "Fodbold" app to obtain information about

the match (date, location)
the participating teams (team names, player lists, and coaches)
substitution players
and match specific rules (duration, period of validity of yellow cards, decision making in case of equal goals after end of match time).

Depending on the tools a referee uses during the match, this information must be transferred from the DBU app to the tool. For conventional tools this includes e.g. setting the match time on the sports watch and taking notes on the note block about substitution players. If the referee uses a digital solution such as RefLevel or the offer of a competitor without access to the association's data, the administrative burden before the match increases considerably. This is because rules regarding a penalty shootout for example can traditionally just be applied by the referee during the match but must be explicitly communicated to a digital solution to work properly. The software service RefLevel can simplify this process by receiving match information directly via DBU's API whenever a match is assigned to the user. On the one hand this increases the convenience for the referee, on the other hand it also eliminates a possible source of error because RefLevel is automatically set to the correct rule set during the match.

From a developer's point of view this is a design challenge that should not be underestimated, because in order for the app to work properly all rule constellations have to be considered. The fact that the data about the matches and the rules are inevitably stored in our database (Google Firebase), results in the possibility of statistical evaluation. Since DBU itself is of course also in possession of these data, there is no advantage for us here at the national level. An international comparison showing how different rules influence football might be interesting at a later date.

During the match. Before the kick-off, the referee has to carry out some checks. This comprises counting the number of players on the field

and inspecting the goals, the corner flags, and the ball. After picking a kick-off team the match can start. During the match, the referee is the authority on the field who ensures the match is in accordance to the football rules. Furthermore, the referee is in charge of recording incidents like substitutions, goals, yellow and red cards and he might, but is not obliged to track his performance as an athlete. The referee has his watch, a yellow card, a red card, his note block, and pen. DBU does not offer any digital tools to support referees, but it is worth mentioning that around 2012 DBU developed a phone app to support referees during the match. This project had to be terminated due to legal difficulties with a Norwegian company which had a similar product. However, this company no longer exists.

A key aspect of RefLevel's value proposition is replacing paper and pen and meeting the need for a digital, smart-watch based tool for referees. Since the vast majority of current smart-watches can only access the internet via the smartphone, all data generated during the match will only be available after the match, when the referee synchronizes the data on the watch with his smartphone.

Then again, all signs indicate that smart-watches will have their own internet module in the future, resulting in interesting opportunities for broadcasting live information of the match.

After the match. When a lower league game finishes, the person in charge of "Livescore" or "KampFakta" will report the game results to DBU's IT-system. Lower league referees are only responsible for reporting red cards, and yellow cards do not get reported, because in lower league football a yellow card is only valid for a period of 10 min during the game. RefLevel can automate the reporting of results with appropriate API access, so "KampFakta" would become redundant.

Some of the information that RefLevel generates during the game has immediate value to the referee himself. This includes the possibility to review his body performance by the sensors provided in smart-watches. The heart rate is an indicator of how close to his performance limit the refer-

ee was at certain moments during the game. In addition, the heart rate after the game provides information about how quickly the body can recover from the strain. The GPS module allows to measure the sprint and jogging performance of the referee and combined with the heart rate and static body metrics like weight and body size, the calorie consumption can be calculated. Furthermore, the GPS data can be used for strategical performance reviewing, because there are certain running patterns a referee should follow to gain an advantage. Last but not least, the referee can review his refereeing performance (all incidents during a match). The possibility to share the data generated by game management for football refereeing with other stakeholders than referees will be discussed in chapter 4.

2.2 Disruptive Innovation and SportsLevels' strategy

INTELLECTUAL HISTORY OF DISRUPTION

“Disruption is an overused term rendered almost useless as a conveyer of meaning. However, in its application to business management, it did not start that way” (Gans, 2016, p. 13). Therefore, as a first step to answer WQ 2 “How can the theories of disruptive innovation help to form SportsLevels' strategy?” we highlight the academic path from which modern theories of disruptive innovation have evolved and point to publications, which had a significant impact on its development. In his book “The disruption dilemma” Joshua Gans states that “[t]here has been a tendency to adopt a single theory as to how disruption might occur: namely, it occurs because new entrants bring in new product innovations at the low end whose improvement ends up felling incumbents that have blind spots. This is the theory proposed by Clayton Christensen [...]” (Gans, 2016, p. 9). This short course through history intends to broaden the readers understanding of the phenomenon of Disruptive Innovation. Subsequently, the three main theories of Disruptive Innovation are presented and afterwards the implications for corporate strategy are discussed.

SCHUMPETER: CAPITALISM, SOCIALISM AND DEMOCRACY

“Can capitalism survive? No, I do not think it can.” (Schumpeter, 1942, p. 105) is perhaps the most famous quote from Schumpeter's 1942 book “Capitalism, Socialism and Democracy”. With his prognosis of the decline of capitalism within half a century, Schumpeter has failed as much as Marx with his vision of the world revolution. Nevertheless, it is generally worthwhile to study his work due to the influence it has. Wikipedia calls it “one

of the most famous, debated and important books on social theory, social sciences and economics” (Wikipedia 2a, 2018) and a study of Elliott Green (Green, 2016) shows it is the third most cited book in the social sciences published before 1950, behind Marx's “Capital” and “The Wealth of Nations” by Adam Smith. The high regard that Schumpeter's work still enjoys today is due to the “remarkable clarity with which Schumpeter predicted developments that are now evident to all: The long-term, on average, decreasing rates of economic growth and the associated effects on unemployment, the global wave of mergers and the associated trend towards ever larger companies, the disappearance of the entrepreneur who identifies with his company, in favour of extremely high-paid and over-self-serving top managers.” (Wikipedia 2b, 2018).

“Capitalism, Socialism and Democracy” is divided in four main chapters. The first chapter deals with the Marxian Doctrine (Marx the prophet, sociologist, economist, and teacher). The second and third chapter deal with the questions whether capitalism can survive and whether socialism can work. The last chapter discusses socialism and democracy. In relation to this master thesis, “Capitalism, Socialism and Democracy” is relevant because it is the origin of modern disruption theories as “it introduces the concept whose lineage to disruption can be most clearly seen: ‘creative

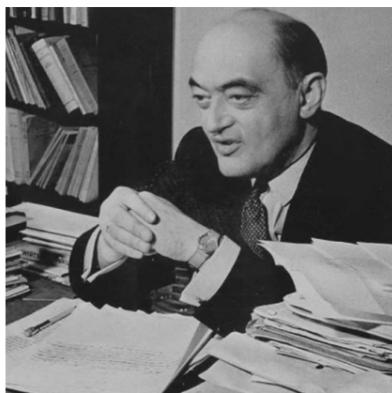


Figure 14: Joseph Alois Schumpeter

destruction.” (Gans, 2016, p. 16). Furthermore, the sociological and economical parts of chapter 1 are relevant, because they related to modern discussions like “character trades of entrepreneurs” and “implications of company size” respectively.

Marx the sociologist. Schumpeter strictly disagrees with Marx's sociological definition of capitalism as a society with exactly two classes (bourgeoisie and proletariat), calling it a “bold stroke of analytic strategy which linked the fate of the class phenomenon with the fate of capitalism in such a way that socialism, which in reality has nothing to do with the presence or absence of social classes, became, by definition, the only possible kind of classless society, excepting primitive groups.” (Schumpeter, 1942, p. 40). Furthermore, Schumpeter argues that it misses the salient point about social classes in capitalism, since individuals constantly have the possibility to progress to the highest social classes, if they succeed as entrepreneurs. According to Schumpeter, large private wealth is not a necessity for becoming an entrepreneur, as there are always investors who want to invest their assets profitably. The real prerequisite for successful entrepreneurship is personal superiority, which Schumpeter characterizes by above-average energy and intelligence. Current research on this topic, sometimes referred to as the “Born or Made” debate, paints a finer picture of the personal prerequisites for successful entrepreneurship. Publications like (McKelvey & Lassen, 2013) or (Kragh, Jørgensen, & Thrane, 2015) suggest founders share a set of characteristics and traits such as:

- “Networks, social capital to access market and technological opportunities.
- In specific cases, experience and education matter.
- Designing the venture, done by relating the founder's ability to perceive opportunity recognition with external factors such as luck, technology, market growth and so on.” (McKelvey & Lassen, 2013, p. 60)

Marx the economist. Schumpeter thinks of Marx's economic vision as a chain of theories in which the individual parts are logically linked. Loosely speaking, this chain consists of theories about exploitation of labour, a theory about capital accumulation and finally a theory about concentration and centralization of companies and institutions. Schumpeter considers most parts in this chain of theories either completely wrong (“Marx's theory of surplus value is untenable” (Schumpeter, 1942, p. 61)) or partially inadequate (“Marx himself did not satisfactorily establish that compulsion to accumulate, which is so essential to his argument” (Schumpeter, 1942, p. 61)). However, this criticism is also opposed to an admiration of Marx's work, as Schumpeter shares Marx's general vision that only ever larger companies can survive: “To predict the advent of big business was, considering the conditions of Marx's day, an achievement in itself. But he did more than that. He neatly hitched concentration to the process of accumulation or rather he visualized the former as part of the latter [...]” (Schumpeter, 1942, p. 63). Furthermore, Schumpeter points out that there are other, un-Marxian theories that can correct the parts in the chain where Marx himself failed. Last but not least, Schumpeter admires Marx for being the first to have the vision and theory about capitalism as a process that has innovation as an inherent feature, “producing at every instant that state which will of itself determine the next one” (Schumpeter, 1942, p. 79). In the end, both come to the same conclusion that one day capitalism will be replaced by a socialist system.

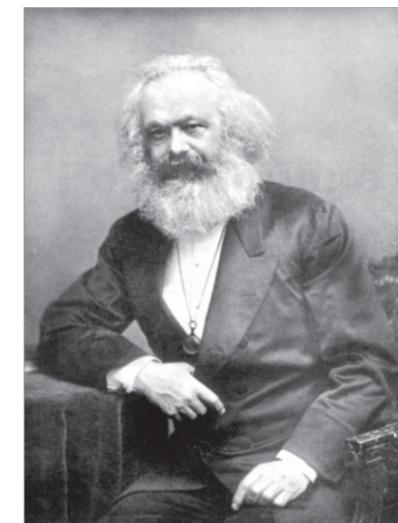


Figure 15: Karl Marx

Size matters. Two decades after Schumpeter's "Capitalism, Socialism and Democracy", and short before becoming a Nobel laureate for his "replacement effect theory" (elaborated later in this chapter) Kenneth Arrow (Figure 23) published a paper titled "Economic Welfare and the Allocation of Resources for Invention" (Arrow, 1962) in which he refines why big companies might have a competitive advantage in innovation compared to smaller ones. For Marx and Schumpeter, "the battle of competition is fought by cheapening commodities" (Schumpeter, 1942, p. 62) and at one point only big companies have the resources to invest in newer, more efficient means of production. Arrow investigates the process of resource allocation under high uncertainty and states "the economic system has devices for shifting risks, but they are limited and imperfect; hence, one would expect an underinvestment in risky activities" (Arrow, 1962, p. 614). Arrow defines invention as the production of information and explains that creating a market to sell such information is extremely difficult because "there is a fundamental paradox in the determination of demand for information; its value for the purchaser is not known until he has the information, but then he has in effect acquired it without cost" (Arrow, 1962, p. 615). Furthermore, Arrow sees enormous difficulties in protecting a hypothetical information market through legal constructions like patents as they would have to be unimaginably complex and subtle and would reveal the information in the process of defining it. From a commercial point of view, the lack for a market to sell information/invention makes basic research a particularly risky activity, as basic research produces information that typically has no direct commercial use but serves as input for more commercially applicable research projects instead. Here, Arrow sees an advantage for big companies as they have the ability to diversify the commercialization risk across many parallel research projects and decouple the personal situation of the researcher from the success of the project. In this sense, big companies act like as their own insurance company. However, Arrow

considers this as an imperfect solution, since every insurance has a moral factor, meaning whenever people are not personally responsible for the results of their action, it can dull the incentives to work towards success. In relation to WQ 2 how the theories of disruptive innovation help to form SportsLevels' strategy, a first intermediate result can be recorded here.

1) **It can be very risky for a start-up company to rely their success purely on technological research.**

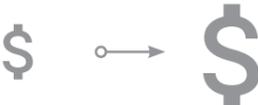
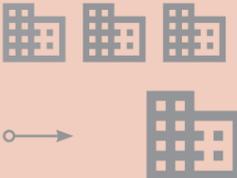
This opinion is shared among others by Tim Brown, the CEO of the famous Design Thinking Agency IDEO:

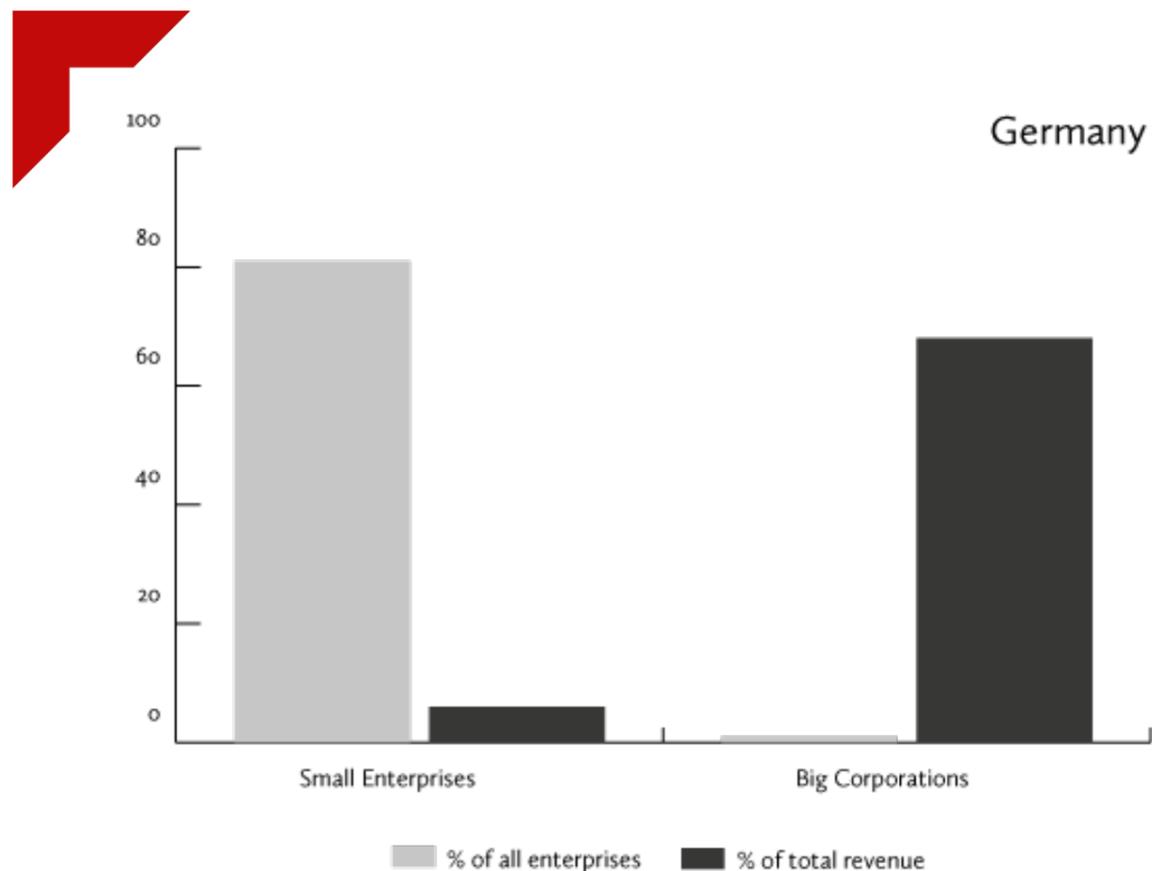
"Reliance on technology is hugely risky. Relatively few technical innovations bring an immediate economic benefit that will justify the investments of time and resources they require." (Brown, 2009, p. 20)

150 years after the appearance of "The Capital" and 75 years after "Capitalism, Socialism and Democracy" it is interesting to see to what extent those theories were correct. History has confirmed Schumpeter's criticism of i.e. the immiseration thesis, since the times of bitter poverty for workers have obviously been overcome. Regardless of the accuracy of individual theories, current data reflect Marx's and Schumpeter's shared general prediction of the advent of big business, as the numbers for Germany and Europe in the figure on the right page show. A huge number of small and medium enterprises (SMEs) exists in Europe, on the other hand a large part of the total revenue is generated by a few big corporations. This is consistent with Marx's and Schumpeter's prediction that SMEs will focus on niche markets which are not profitable enough for big corporations in order to survive.

The data also reflects what modern disruptive innovation theories like the one from Clayton M. Christensen describe: The cost structure of large companies forces them to limit themselves

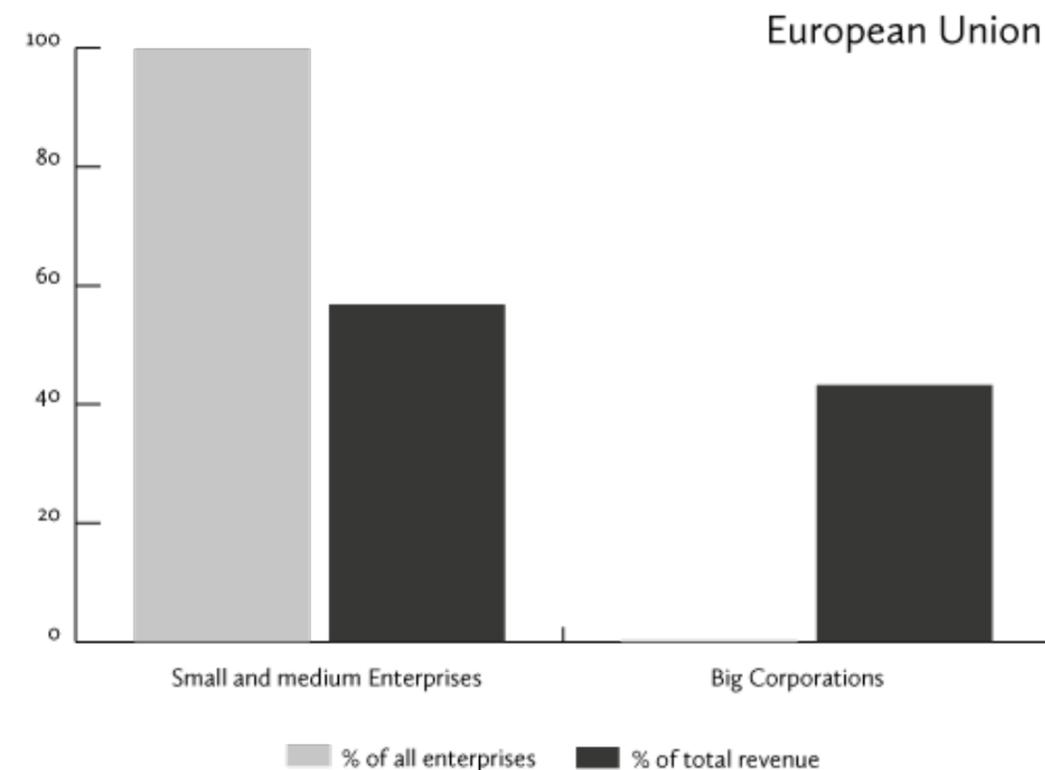
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THEORY	MARX	SCHUMPETER
Exploitation of labour 	<ul style="list-style-type: none"> Workers value: working hours to raise, feed, dress and house the worker "Surplus value" remains with the capitalist alone 	<ul style="list-style-type: none"> A worker's salary is determined by other factors It is far from clear, that the surplus remains at the capitalist Marx's theory of surplus value is untenable
Capital accumulation 	<ul style="list-style-type: none"> Gains induce capitalists to expand production, because from the standpoint of every one of them that means more profit The mass effect of this tends to reduce surplus values through the ensuing rise in wage rates and a fall in the prices of products 	<ul style="list-style-type: none"> Generally agrees with this theory In order to escape being undersold, every firm is in the end compelled to follow suit, to invest in its turn and, in order to be able to do so, to plow back part of its profits, i.e., to accumulate.
Concentration and centralization 	<ul style="list-style-type: none"> The capitalist process has the tendency to increase the size both of industrial plants and of units of control Expropriation: The larger capitals beat the smaller by cheapening commodities. 	<ul style="list-style-type: none"> Inadequate because of the exclusive emphasis placed on the size of the individual "capitals" while in his description of effects Marx is much hampered by his technique which is unable to deal effectively with either monopoly or oligopoly.



“Marx’s analysis is still valid today, as current figures from the Federal Statistical Office show: large corporations make up only one percent of German companies, but in 2012 they generated 68 percent of total revenue. At the same time, 81 percent of all companies are micro-enterprises - but together in 2012 they only accounted for a full 6 percent of sales. So, the German economy is extremely concentrated; a few large corporations control the entire value chain, from raw materials to sales”.

(Herrmann, 2018)



“The analysis of SME performance in the present report focuses on the non-financial business sector. This broad sector consists of all sectors of the economies of the EU-28 Member States, except ‘financial services’, ‘government services’, ‘education’, ‘health’, ‘arts’, ‘culture’ and ‘agriculture, forestry, and fishing’. However, due to data limitations, the review and analysis of self-employment in Chapter 7 of the report covers the whole economy. Overall, in 2016, SMEs in the EU-28 non-financial business sector accounted for: almost all EU-28 non-financial business sector enterprises (99.8 %); two-thirds of total EU-28 employment (66.6%); and slightly less than three-fifths (56.8 %) of the value added generated by the non-financial business sector (Table 2).”

(Patrice Muller, 2017)

to extremely profitable markets. SMEs rarely survive a frontal confrontation with large companies in these highly profitable markets. On the other hand, the need for big corporations to operate in highly profitable markets creates space in less profitable niche markets where SMEs can gain a foothold without competing against big companies. In case a SME in such a niche market develops a product that is technologically different but ultimately more successful than existing products and at the same time can profitably be produced in a low margin niche market, the possibility for disruption arises. Christensen's theory is explained in detail in a following subchapter. However, a second partial answer to WQ 2 can already be formulated:

2) Start-up companies can avoid superior competitors and gain a foothold if they focus on niche markets.

Creative destruction. Marx and Schumpeter supposed that it is easier for big companies to innovate because of the resources available to them. In contrast, today many economists and business thinkers like Mitsuru Igami or Salim Ismail take the opposite view that SMEs have systematic advantages over big companies in terms of innovation. Either way, it is agreed that even today successful innovation triggers a chain of capitalist mechanisms that ultimately leads to corporate concentration. Seen that way, the thoughts of the old economic avant-garde are not that different from what Ismail is claiming as a new era of “winner-takes-all” markets:

“We seem to be entering an era of “winner-takes-all” markets. There’s really only one search engine (Google), one auction site (eBay) and one e-commerce site (Amazon). Network effects and customer experience lock-in seem to be at the root of this fundamental change in the nature of competition.” (Ismail, 2014, p. 121)

Finally, it is important to emphasize one thing: The understanding of capitalism as a process that enables innovative companies to enter a monopoly position does not mean that those companies become invulnerable. Correspondingly, the data displayed earlier only shows that at a certain point of time there are profitable companies which grew big, but the data says nothing about the past of these companies or their future. The salient point, and maybe Schumpeter's greatest achievement, is that capitalism must not be seen statically but as a process of constant progress, and “economic progress, in capitalist society, means turmoil” (Schumpeter, 1942, p. 60). The motor that drives this constant change and that ensures long-term economic growth is what Schumpeter terms “creative destruction”: “Possibilities of gains to be reaped by producing new things or by producing old things more cheaply are constantly materializing and calling for new investments. These new products and new methods compete with the old products and old methods not on equal terms but at a decisive advantage that may mean death to the latter. This is how “progress” comes about in capitalist society. In order to escape being under-sold, every firm is in the end compelled to follow suit” (Schumpeter, 1942, p. 60). Schumpeter argues that this force of creative destruction “acts not only when in being but also when it is merely an ever-present threat. It disciplines before it attacks.” (Schumpeter, 1942, p. 140). Thus, companies in a monopoly position are constantly forced to innovate even though in Schumpeter's vision they are superior to SME competitors. Later in this chapter, three different theories (“Disruptive Innovation” by Clayton M. Christensen, “Architectural Innovation” by Kim Clark and Rebecca Henderson, and “The replacement effect” by Kenneth Arrow) will be presented, that explain why beyond being an ever-present threat, the force of creative destruction actually causes the failure of big companies:

“Incidentally, another scholar who subsequently joined me in the study of this phenomenon, Michael Raynor of Deloitte Research, has noted that

disruptive technology is probably the cause behind the “creative destruction” that economist Joseph Schumpeter observed to be the primary engine of economic progress more than half a century ago. I think Michael is right.” (Christensen C. M., 1997)

TECHNOLOGICAL DISCONTINUITIES

Schumpeter identified the process of creative destruction, but he didn't explain which characteristics an innovation needs in order to be a potential candidate for creative destruction. In search for an answer, the generations following Schumpeter examined the relationship between creative destruction and technological change.

S-curves. Italian researcher Giovanni Dosi developed the concept of “technological paradigms”, meaning that for a certain period of time, an opinion prevails on how a particular problem should technologically be solved. Adhering to such a technological paradigm keeps companies focused, but it causes problems when a new and ultimately more successful paradigm emerges. Later, the notion of “technological paradigms” was, “reinforced, further developed, and grounded in its implications for innovation strategies for business by McKinsey director Richard Foster in a 1986 book” (Gans, 2016, p. 18) which resulted in the well-known S-curve relationship between effort (labour or capital) and performance improvement. Foster observed that initially, when developing a fundamentally new technology, high effort only yields to small performance improvements. As the development

of a new technology progresses, the relationship between effort and performance improvement is reversed and small amounts of effort yield to rapid enhancement. At some point, however, the potential for improvement of this technology is coming to an end and once again small improvements can only be achieved with great effort.

In relation to disruption it gets interesting if a technology used by incumbents has reached the plateau of its S-curve and at the same time new entrants elsewhere develop a new, fundamentally different technology that does the same job and initially offers lower performance. In such a situation, it is a rational decision for incumbents to continue to focus on their existing technology, as switching to the new technology would result

in lower performance. Furthermore, it is uncertain whether the S-curve of the new and fundamentally different technology will ever reach the point where it surpasses the S-curve of their current technology. However, if the new technology gets to the steep point of the S-curve where little effort leads to huge performance improvements, there will be little time left for incumbents to bridge the technological discontinuity and adopt the new technological paradigm. Contrary to Schumpeter's view that big companies are disciplined by the latent threat of creative destruction and have an edge on innovation, “Foster argued that new entrants into an industry were not so encumbered by a past focus and so were more willing to explore the new technology path. If they could do so until the S curve bent upward and could control the technology through that point, the entrants would eventually outcompete the incumbents.” (Gans, 2016, p. 19)



Figure 16: Giovanni Dosi



Figure 17: Richard Foster

Dominant Design. When a new technology arises (i.e. cars, airplanes, or mobile telephones), there are opportunities for new entrants to experiment with different designs in order to learn about their advantages and disadvantages. In the S-curve model, this is the flat, initial part, where effort doesn't lead to huge performance improvements. However, at one point a dominant design emerges, which is "something akin to a standard way of doing things" (Gans, 2016, p. 40). Once a dominant design is found, the development of a technology will shift from experimenting with fundamentally alternative designs to improving the way the dominant design works. This concept, which was researched by James Utterback and Bill Abernathy in the 1970s, explains the sudden increase in efficiency that occurs in Foster's S-curve model. As discussed in the previous section, the rapid improvement of a new and initially inferior technology can bring down incumbent companies, if they have previously stuck to an old technology for sound reasons. This is why the emergence of a dominant design for a new technology can be the disruptive event for companies that serve a similar need to customers based on an old technology.

Price. Until now, we have presented the process of creative destruction and showed the linkage to the invention of new technologies that offer superior performance. But of course, a discussion of disruptive technological performance needs to consider the price of those technologies as well. Dartmouth professor and author of "The Wide Lens" Ron Adner, to whom "creative destruction has been a source of fascination" (Adner & Kapoor, Right Tech, Wrong Time, 2016) analysed this connection after reading Clayton M. Christensen's "The Innovators Dilemma". Adner studied the relationship between product design and demand and stated that a product has different attributes that creates value for consumers. However, not all consumers value the same attributes to the same amount, and some consumers who do not need top performance will prefer to compromise on all value creating attributes, if they can get a solution

for a lower price. As a consequence, an incumbent cannot defend its offer to those consumers through non-price value, if an entrant incubates in a low-end market and finds a cheaper way to offer a comparable solution.

DEMAND SIDE DISRUPTION: DISRUPTIVE INNOVATION

Clayton M. Christensen's "Disruptive Innovation" theory is the first of three disruption theories that will be discussed in this master thesis. Joshua Gans refers to this theory as the "demand side theory" of disruption, because incumbents get disrupted when the demand of their main stream customers can be satisfied by the offering of new entrants coming from the low-end of the market with initially inferior but continuously improved, disruptive technologies.

Christensen (Figure 18) investigated the annual publication "DISK/TREND Reports (1977-99)" to gather data about a phenomenon, which has happened multiple times throughout all industries:

"When a new technology that has the potential for revolutionizing an industry emerges, established companies typically see it as unattractive: it's not something their mainstream customers want, and its projected profit margins aren't sufficient to cover big-company cost structures. As a result, the new technology tends to get ignored in favour of what's currently popular with the best customers. But then another company steps in to bring the innovation to a new market. [...] The new technology invades the established market. By the time the established supplier – with its high overhead and profit margin requirements – wakes up and smells the coffee, its competitive disadvantage is insurmountable." (Christensen C. M., 2015, p. 3)

It is key to the mechanism of demand side disruption that incumbents are well managed and have a strong customer focus. In Christensen's context, incumbents are well-managed if they continue to make the rational, sound choices that have led to success in the past, and their process and technologies are top performing. If incumbents are "poorly managed, complacent, fraudulent, or doing things differently because they are now shielded by barriers to competition [...] it is not what we mean by disruption" (Gans, 2016, p. 9). Good management practices and a strong customer focus lead an incumbent company to prioritise on delivering the price/performance ratio their up-market mainstream customers are asking for. Listening to the best customers is solidified by rivalry between competitors and the prospect of high profit margins. Over time, however, this creates a cost structure in the incumbent company which is too high to be profitable on low margin jobs. Accordingly, allocating resources for innovations whose performance are at first insufficient to serve the profitable mainstream customers is penalized. This compulsion to accumulate leaves the down-market completely open to new entrants who only have one choice: focusing on low margin customers. Obviously, it is not an uncomfortable position for an established company to own the high margin upmarket and leave the unprofitable



Figure 18: Clayton M. Christensen

rest to new entrants; it is a privilege – provided the new entrant cannot improve the very technologies the established company is ignoring. However, if the opposite occurs, and a new entrant can profitably supply a technology in the low-end market, and furthermore improve this technology to a point where it also becomes good enough for main-stream customers, disruption occurs. The new entrant will rapidly move up-market with a technology that is inherently cheaper. If the incumbent company did not prepare for this up-market movement of the new entrant there will be no time left to react. In the context of Christensen's disruptive innovation, a trap to avoid is comparing the performance improvement rate of an incumbent's technology with the performance improvement rate of a new entrant's technology. What matters is the comparison between the performance improvement rate of the new entrant's technology and the demand of mainstream customers. Christensen's demand side theory is summarized in the table on the next page.

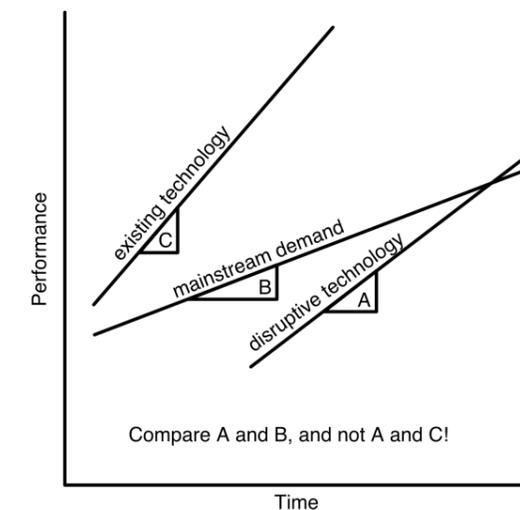


Figure 19: Technological performance and customer demand

DEMAND SIDE DISRUPTION BY CLAYTON M. CHRISTENSEN

REQUIREMENTS	REASON
“The innovation originates in low-end or new market footholds”	“Ever-improving products and services [of the incumbent] often overshoot the performance requirements [...] of less demanding customers. [...] This opens the door to a disrupter focused (at first) on providing those low-end customers with a ‘good enough’ product.”
“The innovation does not catch on with mainstream customers until quality catches up to their standards”	“Disruptive innovations [...] are initially considered inferior by most of an incumbent’s customers. Typically, customers are not willing to switch to the new offering merely because it is less expensive. Instead, they wait until its quality rises enough to satisfy them. Once that’s happened, they adopt the new product and happily accept its lower price. (This is how disruption drives prices down in a market.)” Therefore, incumbents might not see the disrupter as a threat initially and do not react until it is too late.
“A novel technology or business model that allows new entrants to move upmarket without emulating incumbent’s high costs”	Otherwise the new entrant will have to adopt a similar cost structure as the incumbent, which leads to a mere price competition, but not demand side disruption.

MECHANISM	REASON
“The disruptive effect drives every competitor – incumbent and entrant – upmarket”	“Price-based competition [...] reigns. [...] The smart ones – the true disrupters – will improve their products and drive upmarket, where, once again, they can compete at the margin against higher-cost established competitors.”
“Incumbents rarely respond effectively (if at all) to disruptive innovations”	“A company’s propensity for strategic change is profoundly affected by the interest of customers who provide the resources the firm needs to survive. In other words, incumbents (sensibly) listen to their existing customers and concentrate on sustaining innovations as a result.

PREDICTION	REASON
“The movement from the fringe (the low end of the market or a new market) to the mainstream erodes first the incumbent’s market share and then their profitability.”	The disruptor has a lower cost structure than the incumbent and had sufficient time along the disruptive path to bring product quality to the level that mainstream customers demand without reaction from the incumbent.”

SUPPLY SIDE DISRUPTION: ARCHITECTURAL INNOVATION

Kim Clark's and Rebecca Henderson's "Architectural Innovation" theory is the second of three disruption theories that will be discussed in this master thesis. Joshua Gans refers to this theory as the "supply side theory" of disruption, because the organizational structure of incumbents hinders them to recognize and supply the next generation of a technology, when new entrants in their market offer it.

In their influential paper "Architectural Innovation: The re-configuration of existing", Henderson and Clark point out that "following Schumpeter's emphasis on creative destruction, the literature has characterized different kinds of innovations in terms of their impact on the established capabilities of the firm" (Henderson & Clark, 1990). Traditionally, innovation is categorized in either incremental or radical innovation. Henderson and Clark criticize this categorization as incomplete and misleading, because it can disguise disastrous effects on incumbents coming from seemingly minor improvements in technological products. Henderson and Clark present a finer division into four types of innovation, based on recognizing the difference between the components of a product and its architecture (how those components link together). In the table on the right side the horizontal axis represents the impact an innovation has on components, whereas the vertical axis represents the

impact an innovation has on the linkage between components. We argue, that these four types of innovation can be illustrated using the example of mobile telephony.

Incremental innovation. An example for incremental innovation would be, if the next generation of a mobile telephone includes more memory, a faster processor or a camera chip with a higher resolution. Compared to the previous generation, none of these improvements change the architecture or core concepts of the phone.

Modular innovation. Switching from iPhone 6s to iPhone 7 is an example of modular innovation, because the iPhone 6s was the last iPhone with a physical home button. In contrast, the physical button in iPhone 7 was replaced by a touch sensitive glass surface and a linear actuator which simulates the feeling of clicking. Thus, the core design concept of this component had fundamentally changed, while the architecture of the iPhone remained untouched.

Architectural innovation. When Apple unveiled the first iPhone in 2007, it can be considered an architectural innovation (Figure 22) compared to other good mobile phones of its time. Most of the components in the first iPhone - the LCD screen or the camera for instance, but also the fact that phones can execute 3rd party applications - did not embody a fundamentally different core design concept in comparison to what competitors were using. Instead, the way those compo-



Figure 20: Rebecca Henderson



Figure 21: Kim Clark

Incremental Innovation

"Incremental innovation introduces relatively minor changes to the existing product, exploits the potential of the established design, and often reinforces the dominance of established firms. [...] Although it draws from no dramatically new science, it often calls for considerable skill and ingenuity and, over time has very significant economic consequences."

Modular Innovation

"An innovation that changes a core design concept of a technology without changing the product's architecture"

Architectural Innovation

"Innovation that changes a product's architecture but leaves the components, and the core design concepts that they embody, unchanged. The essence of architectural innovation is the reconfiguration of an established system to link together existing components in a new way. This does not mean that the components themselves are untouched by architectural innovation. Architectural innovation is often triggered by a change in a component - perhaps size or some other subsidiary parameter of its design - that creates new interactions and new linkages with other components in the established product. The important point is that the core design concept behind each component - and the associated scientific and engineering knowledge - remain the same."

Radical Innovation

"Radical innovation, in contrast, is based on a different set of engineering and scientific principles and often opens up whole new markets and potential applications. Radical innovation often creates great difficulties for established firms [...] and can be the basis for the successful entry of new firms or even the redefinition of an industry."

lements were linked is how the innovation came about. Apps provide a good example, because prior to the iPhone developers had to market their content via television advertising and consumers needed to send a SMS to a special phone number, so billing took place via the network operator. Apple fundamentally changed the way how developers and consumers were linked by providing the App Store. This architectural innovation created an easy and direct way for developers to interact with users which in 2018 resulted in 2.2 million apps (Wuerthele, 2017) generating 37.9 billion USD revenue (Mansholt, 2018). Another example for its architectural innovation is the phone functionality. Previously, cell phones had a dedicated key to execute the telephony-related code while other functionality like the video game snake was accessible by navigating a grid style software menu. Apple changed this link by placing the telephony-related code in an app which does not differ from others like the web browser. In hindsight, this seems like a minimally invasive procedure, but changing this link between components has resulted in the iPhone's architecture being perceived as a "smartphone" even though components such as the processor, operating system or the logic of apps were not significantly smarter than the ones any competitor was offering. Although in its nature the iPhone is a completely technical product, those examples demonstrate that innovation must not be confused

with sophisticated technologies or misconceptions of diligence.

Radical innovation. Finally, moving the telephone functionality into a smartwatch is an example of radical innovation. Compared to a mobile telephone, a smartwatch consists of fundamentally different components that are linked in a completely new way and hence a smartwatch also has a fundamentally different architecture.

The link to disruption. Henderson and Clark point out that their conceptual framework is not meant to neatly divide the world into four quadrants, but to suggest that a certain innovation may be less radical and more architectural for instance. Furthermore, there are of course other useful divisions to classify innovation. However, the presented classification is essential in the context of disruption, if Henderson's and Clark's concept of architectural innovation is related to two more concepts. The first one is Utterback and Abernathy's concept of a dominant design. As described earlier in this chapter, the emergence of a new technology begins with a phase of experimentation. At this initial stage, companies develop knowledge about different components and different architectures, that is, ways in which the components are linked to form a product. Over time, it becomes apparent that a particular architecture represents the best compromise among different alternatives. This architecture is then called the dominant design.



Figure 22: Architectural Innovation

For an organization the emergence of a dominant design means, that resources which were previously used for experiments with different architectures can now be used to optimize individual components instead. This also explains why in Foster's S-Curve model after finding a dominant design, the steep part of the curve begins, in which little effort leads to significant performance improvement.

This point, namely that the emergence of a dominant design is accompanied by a change in the organization, is taken up by the second concept. Once it is generally agreed how the architecture of a given product should look like, the recurrent tasks for further development are determined by the architecture of the product. Over time, this influences a company's organizational structure in a way that it becomes an imprint of the architecture of the product it is developing. A car, for example, has the components internal combustion engine, transmission, drive shafts and tires. The presence of these components and the way they are linked is the same for almost every manufacturer. Following this architecture, there is a team dealing with the development of the internal combustion engine while another team deals with the transmission. This division into teams is amongst other things, of course, due to the fact that a single human being is unable to master all the details of a complex technical product. Just as the combustion engine is physically connected to the transmission, there must also be communication channels between the corresponding teams to ensure that the components fit together. In addition, as a company is constantly exposed to an extreme flood of information, communication filters will emerge on those channels to ensure that only relevant information is transmitted through them. It is a peculiarity of such structures of communication channels and filters that they are hidden for people outside the organization and no conscious decisions have to be made about them once they have solidified. Communication structures manifest themselves implicitly, similar to the seating arrangement at a table.

The danger of architectural innovation is that, on the one hand, it destroys the usefulness of old

architectural knowledge incumbents have and on the other hand that it can easily be confused with modular innovation, because investigating a product does not reveal the internal communication structure in the development process. Even if a company recognizes that an innovation is architectural, it still lacks the new architectural knowledge to copy it. Henderson and Clark have documented this phenomenon in detail using the example of the photolithographic alignment equipment industry, but also provide an example in the car industry:

"The problems created by an architectural innovation are evident in the introduction of high-strength-low-alloy (HSLA) steel in automobile bodies in the 1970s. The new materials allowed body panels to be thinner and lighter but opened up a whole new set of interactions that were not contained in existing channels and strategies. One automaker's body-engineering group, using traditional methods, designed an HSLA hood for the engine compartment. The hoods, however, resonated and oscillated with engine vibrations during testing. On further investigation, it became apparent that the traditional methods for designing hoods worked just fine with traditional materials, although no one knew quite why. The knowledge embedded in established problem-solving strategies and communication channels was sufficient to achieve effective designs with established materials, but the new material created new interactions and required the engineers to build new knowledge about them." (Henderson & Clark, 1990)

Henderson and Clark's supply side theory is summarized in the table on the next page.



SUPPLY SIDE DISRUPTION BY REBECCA HENDERSON AND KIM CLARK

REQUIREMENTS	REASON
A dominant design emerges	<ul style="list-style-type: none"> • “[A dominant design] is equivalent to the general acceptance of a particular product architecture and is characteristic of technical evolution [...]” • “A dominant design incorporates a range of basic choices about the design that are not revisited in every subsequent design.” • “Once any dominant design is established, the initial set of components is refined and elaborated, and progress takes the shape of improvements in the components within the framework of a stable architecture.”
“Architectural knowledge becomes embedded in the structure and information-processing procedures of established organizations”	<ul style="list-style-type: none"> • “Established organizations require significant time (and resources) to identify a particular innovation as architectural, since architectural innovation can often initially be accommodated within old frameworks” • “Information that might warn the organization that a particular innovation is architectural may be screened out by the information filters and communication channels that embody old architectural knowledge.” • “Since the core concepts of the design remain untouched, the organization may mistakenly believe that it understands the new technology.”

MECHANISM	REASON
An entrant introduces an architectural innovation, that is on a more favourable technological trajectory than the incumbent’s technology.	<ul style="list-style-type: none"> • The incumbent will only recognize the innovation as architectural after “significant failure or unexpected problems with the design” • “Once an organization has recognized the nature of an architectural innovation, [...] it must first switch to a new mode of learning and then invest time and resources in learning about the new architecture”

PREDICTION	REASON
While the new entrant with the new and ultimately more successful technology will experience great growth, the incumbent will lose market share and suffer from serious financial problems.	<ul style="list-style-type: none"> • “Architectural innovation may thus have very significant competitive implications. Established organizations may invest heavily in the new innovation, interpreting it as an incremental extension of the existing technology or underestimating its impact on their embedded architectural knowledge.” • “New entrants to the industry may exploit its potential much more effectively, since they are not handicapped by a legacy of embedded and partially irrelevant architectural knowledge.”

THE REPLACEMENT EFFECT

The replacement effect is the last out of three disruption theories that are discussed in this master thesis. The theory deals with why companies are not reacting to the introduction of new products. Joshua Gans states, that there are two important forces holding an established firm back: Uncertainty about the success of the new product and the cost of reaction.

Uncertainty. Gans states that “there is a real probability that a product will fail to become a competitive threat. From both, the demand and supply sides, the product may never rise to the minimum quality necessary to threaten the established firm or be able to be supplied in a sustainable, profitable manner by the entrant. Either way, the threat may be dissipated without action from the established firm.” (Gans, 2016, p. 67)

The cost of reaction. The other force hindering a company from reacting to an entrant is the cost of reaction. As described in Clayton M. Christensen’s demand side theory, the cost structure of an incumbent can be too high to profitably operate in a low-margin market. But there is another reason why adopting to a new product might reduce the profits of an incumbent. If the old and the new product offer a similar value proposition, customers will not buy both of them and thus the new product will cannibalize the old product. However, since many products are subject to economies of scale, an incumbent cannot simply transfer customers from the old to the new product without sacrificing profit. In other words, if the old product can only be produced profitably above a certain sales volume, cannibalization will make it unprofitable before the new business is a proper replacement. Gans notes, that this theory “termed

the “replacement effect,” was investigated by Nobel prize winner Kenneth Arrow (Figure 23) in a highly influential publication in 1962” (Gans, 2016, p. 68). Put in a nutshell, the formula is: The profit an incumbent firm generates by introducing a cannibalizing product is the profit of the new product subtracted by the profit it would have received from selling the old product. Therefore, it is easier for new entrants to bring cannibalizing products to the market, because their profits are not diminished by losses in the existing business. Finally, it must be mentioned that the replacement effect does not apply for those innovations which enhance the sales of existing products and in this case, the incumbent is expected to become active as well.

Soft skills. In a research published in 1986, Michael Tushman and Philip Anderson saw that “a firm’s existing profits depended not solely on its products but, perhaps more importantly, on its competencies. Competencies are the skills, abilities, and knowledge that a firm possesses: in modern parlance, the “soft” or intangible stuff” (Gans, 2016, p. 69). Similar to the replacement effect in which an innovation can promote sales or cannibalize an existing product, Tushman and Anderson noted that there are competency-enhancing and competency-destroying innovations. Innovation can relate to both a product and a process, but what matters is that the customer

receives a similar value while the competencies needed to provide that value are fundamentally different. Tushman and Anderson then investigated what happens in the event of major technological discontinuities and found that, in general, competency-enhancing innovations are brought about by incumbents, whereas competence-destroying innovations are introduced by new entrants.



Figure 23: Kenneth Arrow

ESTIMATING DISRUPTION

In the previous chapters we highlighted the academic path from which modern theories of disruptive innovation have evolved and pointed to publications which had a significant impact on its development. First, we discussed Schumpeter and how Creative Destruction is the driving force behind ongoing innovation. After that, we showed how Dosi and Foster linked this principle to technological discontinuities and that difficulties arise for incumbents when the gap to a new, ultimately better technology has to be bridged. Next, we presented Christensen’s demand side theory of disruption, which focuses on technologies whose performance initially cannot satisfy the demand of main stream customers and is thus ignored by incumbents. If a new entrant develops such a technology in a low-margin niche market and can significantly improve the performance attributes main stream customer care for while keeping the cost advantage, it will be difficult for incumbents to react. In contrast, Henderson and Clark’s supply side theory of disruption describes why incumbents are unable to respond to new entrants in the case of architectural innovation, even though they might find that the new technology is better suited for the needs of their customers. Finally, with Kenneth Arrow’s replacement effect or the competency focused Tushman and Anderson version of it, we showed why cannibalization between existing and new products delays incumbent’s innovation.

In an analysis in 2015, Mitsuru Igami (Igami, 2015) dealt with the question of how much the individual theories which have been created after Schumpeter serve as an explanation for the force of creative destruction. Igami analysed the hard disk drive HDD industry based on “DISK/TREND reports” (the same data Christensen used in his PhD thesis) and created a “dynamic oligopoly model” which considers the replacement effect, demand and supply side disruption as well as public influences like patents. Igami created a macro-economic model for the HDD industry (Cournot competition, etc.) and ran simulations based on factual and counterfactual scenarios.

One of his conclusions is that - at least in the HDD industry and to the extent his simulation reflects real behaviour of players in the industry - if

- an incumbent did not have organisational inertia
- there was a cost advantage in R&D
- and the preemptive motives of the incumbent were strong,

Kenneth Arrow’s replacement effect would still be such a strong force that it systematically hinders a rational incumbent from innovating at the same pace as an entrant does and accounts for at least 57 % of the incumbent-entrant innovation gap in this industry.

THE SPEED OF CREATIVE DESTRUCTION IN THE DIGITAL DOMAIN

One topic has not been touched in the previous discussion and that is to which extent the force of creative destruction depends on the speed by which an innovation succeeds. However, it is apparent that an innovation that is slowly becoming established leaves the incumbent plenty of time to adapt to it, whereas an innovation that unexpectedly conquers a market “overnight” presents enormous challenges to the incumbent. This consideration is particularly interesting in the context of digitization. Even though we argue that there is no fundamental difference between digital and non-digital companies regarding the mode of action, provided one or more sustainable growth mechanisms are at work digital products have two inherent attributes, which clearly differentiate them from any other product:

1. In stark contrast to hardware, ownership of production equipment to produce software is very affordable (even to private individuals from third world countries).
2. The production costs of a digital file are independent of the number of copies made.

These two attributes allow digital innovations to expand at a speed unattainable in the physical



world and makes them therefore particularly interesting candidates for disruption. Schumpeter predicted that the process of successful innovation would someday be understood. In the next chapter, we will show to what extent this prediction has become true by presenting two recent and very influential concepts. The first one is “The Lean Startup” by Eric Ries, which focuses on the internal methodology a successful start-up needs. The second one is “Exponential Organizations” by Salim Ismail, which offers a profound view on why digital companies can achieve growth rates that are unattainable to non-digital companies, fuelling the power of creative destruction.

3 THE EXO SPORTSLEVELS

CHAPTER IN BRIEF

Chapter 3 shifts from a theoretical point of view to work and organizational methodology and is divided into two parts. The first part explains how we transformed an early prototype of RefLevel (from the prior semester) into an almost finished product and discusses the extent to which we could implement the lean principles in SportsLevels. The second part is about the concept of exponential organizations and areas in which SportsLevels already possesses the characteristics of an ExO, areas where work needs to be done, and areas where there is an unexploited opportunity for SportsLevels.



3.1 Lean Principles in SportsLevels

In this chapter we will deal with WQ 3 “How to implement the Lean Principles in SportsLevels?”. The chapter is primarily framed by “The Lean Start-up” from Eric Ries (Ries, 2011), because the book describes a process from idea, to testing assumptions into creation of a product, which leads to creation of sustainable business and acceleration on market. This chapter of the report is structured in the same way as Ries’s book. The reason for this decision was to preserve the same thinking line as Ries has and be able to compare theory with our processes from day to day life. Moreover, the chapter introduces hands on methods such as Build-Measure-Learn feedback loop, funnel and cohort among other things. These and other methods will be each time described in “In Use” part of each subchapter. The overall chapter will end with how far did we get implementing the lean principles.

“The goal of a start-up is to figure out the right thing to build - the things customers want and will pay money for – as quickly as possible.”
(Ries, 2011, p. 20)

Eric Ries wrote this sentence in his book “The Lean Start-up” and we find it accurate. According to several entrepreneurs and professors the book is for entrepreneurs to absorb and apply. It offers a guide on how to not be a traditional start-up with judgements based on gut feeling, but instead offers a plan on how to learn and measure outcomes. “The Lean Start-up” is divided into three parts:

1. Vision
2. Steer
3. Accelerate



Figure 24: Eric Ries

Each of these parts comes with examples from the author’s and others’ professional life, typical pitfalls of start-ups, and explanations of how to make a business according to the “lean principles”. In the following chapters we will elaborate the theory and present how we were successful in applying the theory to the RefLevel case.

PART 1 – VISION

Start

Theory: In start of the book, Eric Ries explains that by nature, people feel more comfortable doing what they are used to do. For example, if someone is a programmer (s)he would feel much better programming the whole day than learning. Ries says that learning is frustratingly intangible. However, learning and even more important - learning milestones is one of the ingredients which make start-ups successful. On the other hand, if a start-up bases its decisions on “gut feelings” and makes a lot of long-term plans based on assumptions, then it might find itself on a downward spiral condemned to failure. That is because it wastes human, financial and time resources on something nobody will pay for. This goes against the first sentence in this chapter – build a thing that customers want and will pay money for.

The question arises how to make it right way. Eric Ries writes: “Instead of making complex plans that are based on lot of assumptions, you can make constant adjustments with a steering wheel called Build-Measure and Learn feedback loop. Through this process of steering, we can learn when it is time to make sharp turn called Pivot or when and if we should persevere along our current path. Once we have an engine that is revved up, the

Lean Start-up offers methods to scale and grow the business with maximum acceleration” (Ries, 2011, p. 22). The author also says that a start-up needs to have a vision, for which they employ strategies, and the product is the outcome of these strategies. However, according to lean principles, start-ups must be able to measure when to “take a sharp turn” / pivot, and be able to optimize the product.

In Use: Sometimes, even though we tried to avoid it, people in SportsLevel’s team had tendencies to do what they are good at doing without having a clear execution plan or vision to work towards. It is understandable, if we take the human nature into consideration, however this led us to start the development of a product for referee developers (people who judge a referee’s performance during matches) without having a clear understanding of what we are even building. The project quickly

died, and we got back on track with the main product RefLevel. In regards towards learning milestones, we did not specify nor use any. In hindsight this can be seen as unsuccessful implementation of lean start-up principles, which should be improved in the future of SportsLevels. Furthermore, we did not specify how many potential or paying customers we wanted to have by the end of this semester, which can be considered as poor goals setting for the team. If goals are not voiced, then the team does not know what ideal they are aiming for, nor can they achieve it. However, we did have a vision to develop a product supporting referees in stressful situations on a football pitch. The pictures shown below and on the next page (Figure 25 and Figure 26) show the old user interface as it was at the beginning of this semester. This was our starting point in this semester.

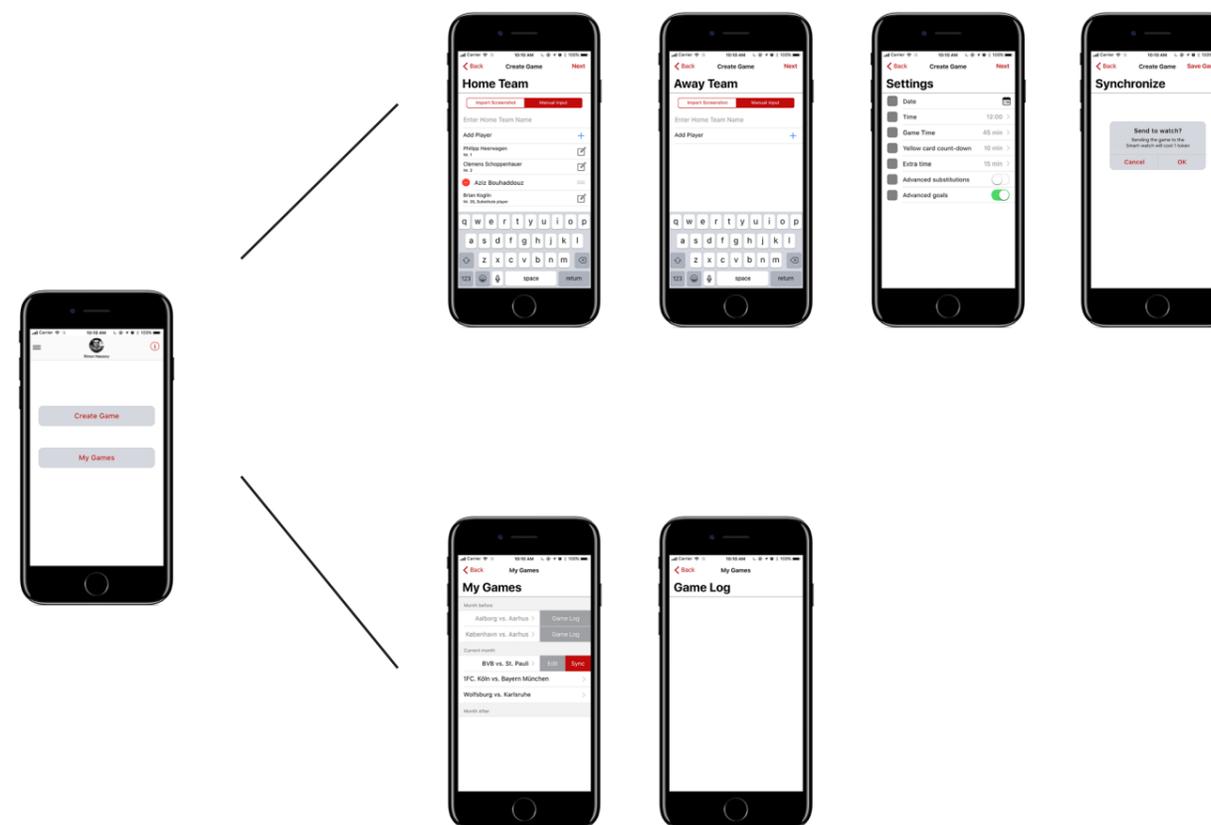


Figure 25: Old mobile user interface from 2017

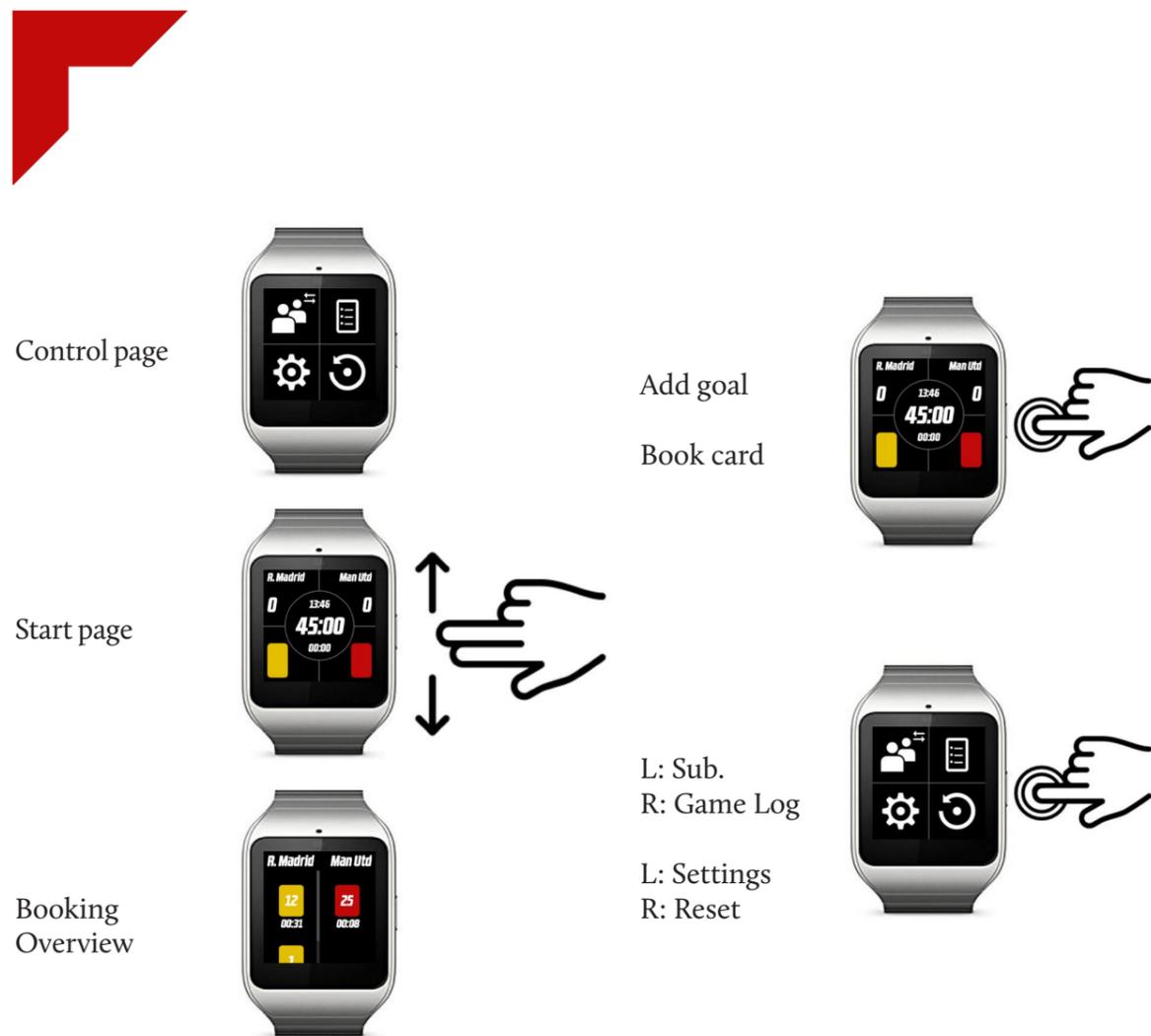


Figure 26: Old smartwatch user interface from 2017

Define

Theory: In order to make record straight, Eric Ries mentions a definition of a start-up which is: “A start-up is a human institution designed to create a new product or service under conditions of extreme uncertainty.” (Ries, 2011, p. 27)

In Use: This quote from Eric Ries applies well to RefLevel. In the start of this semester we were uncertain about several things. Some of them were:

1. Do referees show interest in RefLevel?
2. How do we get new test users?
3. Does RefLevel provides enough value for

early adopters?

4. What obstacles do early adaptors encounter when using RefLevel?
5. Do referees own smart-watches? Would they like to own them?
6. What should we charge money for? How, when and from whom?
7. Are we on a right track or does RefLevel need to pivot?
8. Do we have the right people to execute tasks?
9. Is the communication flow in the team efficient or work people in silos?
10. How to handle HR issues?
11. Who are suitable and valuable persons to include in SportsLevels' Board?

12. Does RefLevel have the potential to scale outside of Denmark?
13. What will happen with the project after this semester is over?

These are just few uncertainties we encountered or will encounter, but step by step we worked on converting uncertainties to certainties. In the following paragraphs we describe how we did it.

Learn

Theory: In the Learn chapter Eric Ries explains his story about how nothing happened after his company launched their product. Out of desperation Ries talked to some potential customers. If they were satisfied, his ego got confirmed that they are working on the right thing. However, if a potential customer was sceptical about his product, he wanted to “fire this customer” and get a new one who would fit better. But this strategy had one issue, because ignoring or arguing with customers does not make sense as they are the people who will in the end pay for a product. Therefore, Ries decided to try out a different strategy. He and his team chose to listen to customers and make validated learning to test their assumptions. However, he mentions that customers often do not know what they want in advance, so therefore, in his company, they conducted experiments by which they could measure customers' behaviour and learn from it. They were imitating a product's features without actually investing extensional hours in building it completely.

In Use: Thanks to The Lean Start-up book, our entrepreneurial engineering education, and other resources, we knew that we needed to find, engage in, and listen to our potential customers and not just sit in our office. We got out in the field and tested our assumptions. At one point, we were even able to attract so many new test users that our product development could not keep up with the demand and we were forced to cancel some user tests. Read more about how we did it in WQ 4 – Community & Crowd (p. 88)

Experiment

Theory: As the name says, this chapter is about experimentation. Eric Ries raises important questions such as:

- “Which customer opinions should we listen to, if any?”
- “How should we prioritize across many features we should build?”
- “Which features are essential to the product and which are ancillary?”
- “What can be changed safely, and what can anger the customer?”
- “What might please today's customers at the expense of tomorrow's?”
- “What should we work on next?”

Moreover, he goes on and describes what a true scientific experiment is. He writes, that a scientific experiment follows a method. It starts with clear hypothesis and makes prediction on what is supposed to happen. It then tests those predictions empirically. An experiment is guided by the startup's vision. The goal of such experiment is to get knowledge on how to build a sustainable business around the vision (Ries, 2011, p. 56 - 57). Experimentation also allows start-ups to get surprised, because people sometimes behave differently than expected, so in such situations observation proves to be sufficient. Most importantly of all, start-ups need to get out of the building and engage with real world customers.

In Use: As mentioned in the beginning of this chapter we picked up RefLevel development, where the last semester group ended. The first thing we reviewed was the mobile phone interface, since a user first needs to either manually enter players' names or get it automatically synchronized with DBU's players' lists. We made a first learning loop with three low-fidelity designs Appendix A (p. 152) through which we tested our assumptions with two grassroots referees Kenneth Kvist and Peter Vestergaard Eriksen from Aarhus.

Below is the time line of our user tests (Figure 27).

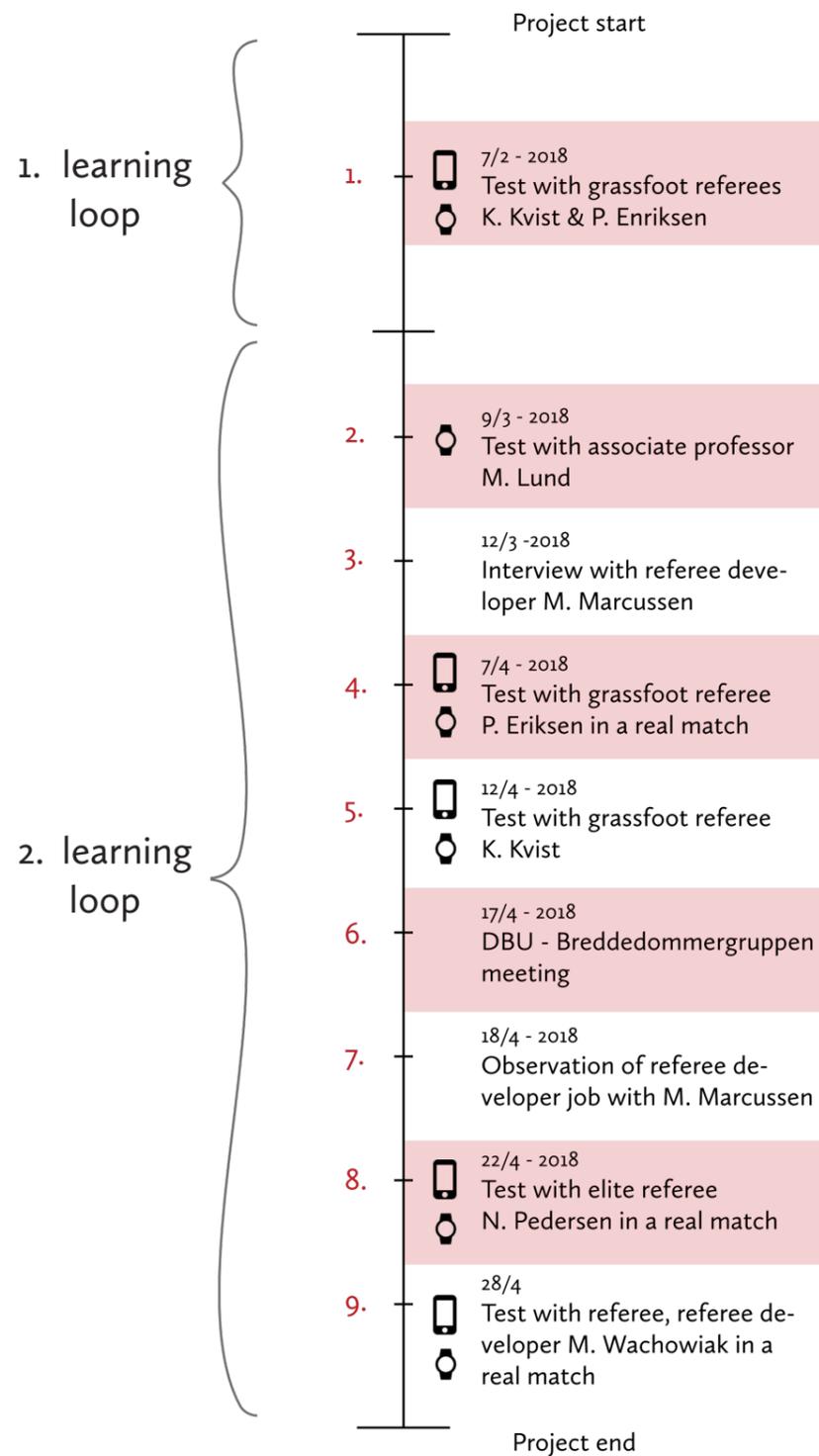


Figure 27: Project's time line

First learning loop

- 1. 7/2 - 2018
Test with grassfoot referees
K. Kvist & P. Enriksen

The plan was to use three suggested low-fidelity designs Appendix A (p.152) and test them (by giving tasks to fulfill) with the focus group in Aarhus.

- The testing method was a thinking aloud test, observation, and a structured questionnaire.
- The desired result was to see if a referee can navigate through RefLevel (mobile interface) without our interruption, complete tasks, and understand it.

- Questions:
 - Are test users also willing to use RefLevel in real matches?
 - Is it better to create and display "Home Team" and "Away Team" on a single screen or should they be spitted up in two separate screens?
 - (Before we talked with FLU - Brededommergruppen, RefLevel's feature to add players was completely manual) How should referees identify players? "Identify Players By Name", "Identify Players By Number", or "Identify Players By Number And Name"?
 - By which criteria should teams be sorted?

- Answers:
 - Users are willing to use RefLevel in real matches, too. They asked if we can borrow them the smartwatch.
 - "Home Team" and "Away Team" screens should be separated.
 - Players should be Identified By Number or Identified By Number And Name (Figure 28 on the left side).
 - Teams should be sorted by leagues and for interactions drag & drop should be used (Figure 29 on the ight side).
 - We learned also things which we did not know. For example, on the "match-



Figure 28: Adjustments suggested from test users (date & identification)



Figure 29: Adjustments from test users 2 (sorting teams by league)

es overview screen", users preferred to have the date on a left side next to a team's name instead of under a team's names.

- Evaluation:
 - "Home Team" and "Away Team" stayed on a single screen
 - Players identification was done by Name and Number
 - Matches overview screen: Date moved on the left side next to teams' names
 - No sorting of teams by league. The reason for this decision was that SportLevels focuses on football as a mass sport therefore a division between Superliga, Nordicbet, and Øst, Vest does not make sense.

When meeting with Kenneth Kvist and Peter Vestergaard Eriksen in Aarhus, we used the opportunity to test the old smartwatch design as well and see where improvements are needed. The plan, testing method, and desired result stayed the same. However, the questions and answers were different.

- Questions:
 1. Do test users know how to access subpages on the smartwatch?
 2. Do they know how to exit these subpages?
- Answers:
 1. Test users did not intuitively know that there are other subpages besides the main page, nor could they access them without our help.
 2. They struggled to exit subpages by sliding. In comparison, on a few screens we still had the old design with arrows. They understood back arrows immediately and could use them without any trouble.
 3. The test users liked that RefLevel offers a possibility in settings to have a timer for yellow cards.
 4. In the settings subpage, they did not understand term “advanced goals”.
 5. Referees do not always get players lists with players’ names beforehand. Therefore, for them, when choosing a player who receives a yellow card, it is only necessary to have the player’s number but not his name.
 6. They missed an option to pause the match.
 7. One user wanted to pause a match but pushed on the reset button instead, so the whole match disappeared. In a real match this would be a disaster because all data from this match would be gone.
- Evaluation:
 1. Since users did not know how to navigate the app even in normal condi-

tions, it became uncertain how they would be able to navigate in stressful situations on a football field. We needed to think again about the usability. The app should support a referee, not frustrate him. Therefore, we decided to develop a new user interface that focuses more on those factors.

2. The new user interface had to make sure that users know how to exit subpages and navigate the app smoothly.
3. In the settings subpage, we decided to keep the term “advanced goals” since it describes a situation when a referee wants not only to add a goal to a scoring team, but also wants to choose a player who scored a goal. However, this function was not developed further on because at that time, it was considered a “nice to have” instead of a “must have” feature.
4. We got suggested that when a referee chooses a player for a yellow card, he does not need the player’s name, but only the player’s number. We decided to include both numbers and names. In an instance, that a referee only adds numbers, then names would not be displayed on yellow card player overview. However, a referee is not able to add only a name without the number.
5. Referees asked for a pause match option, and we were aware of it. Unfortunately, somehow, we could not decide where should it be or how it should function. We made few low-fidelity images and postponed this feature for later development.

Second learning loop

This was our first learning loop, in the second loop we decided to focus more on the smartwatch inter-

2. —  9/3 - 2018
Test with associate professor M. Lund

face and its usability. There were two reasons for this decision. The first was that smartwatch usability is crucial and should not be frustrating or confusing. The second reason was, that we made tests with the mobile user interface at that time and we had an idea which bugs to fix there. But with the smartwatch interface we were on a starting line. The smartwatch interface was developed using the Apple Watch design resources. Here it is important to mention, that this design was never tested with users, instead, thanks to our supervisor, we were able to look through the design and discuss it with Aalborg University assistant professor Morten Lund from the Department of Communication & Psychology with a special interest in user-interfaces. This was a rather spontaneous event; therefore, we were not especially prepared. We asked Lund if he is ok with filming the interview, we took notes, and evaluated them afterwards. We told Morten who we were, what we worked on, and showed him our designs on a projector. Our smartwatch designs can be seen of the following double page Figure 31.

- The plan create a low-fidelity prototype using the Apple Watch design resources and display them to Morten Lund using a projector.
- The testing method was to read about Apple’s Human Interface Guidelines, make hand drawn images, and convert them into Photoshop drawings, test them with referees. However, before we could set tests with users, we had a meeting with Morten. Evaluate and execute suggestions of user movement expert Morten.
- The desired result was to create a RefLevel user interface for rectangular smartwatches which has an intuitive and smooth and user experience.



Figure 30: Meeting with assistant professor Morten Lund

- Questions for Morten:
 1. Is RefLevel’s design intuitive?
 2. How can we make it even easier to use for referees?
 3. Does the design fit to actions of a referee on a football match field?
- Answers from Morten:
 1. The design is intuitive, but we should strive for using the same structure both on IOS and Android, so the mental model you are supporting is the same independently of the technical platform.
 2. Do not present too much information on the display at once. Prioritize, what and when should a referee see information on a screen during a football match. Think about context in which a referee uses the app.
 3. Try to make scenarios, and foresee everything what can go wrong before, during, and after a football match. E.g. What happens if a referee forgets to start a match after a pause? Should he be able to add or deduct the time?
 4. With RefLevel you are supporting two

Figure 31: Watch design 1, to which we got a feedback from assistant professor Morten Lund from the Department of Communication & Psychology

Smartwatch design 1

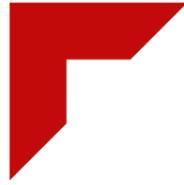


things. The first is the referee, his authority on a football field and his job. The second thing and more important, you are also supporting the whole match as such (the history of the match is recorded through RefLevel's match log). Therefore, a referee has to be certain about his actions. No space for doubts, or misunderstood navigation. The reason for this is, that match log is information, which a referee will give to DBU after a match is over. You are creating and supporting the match system.

- I. Be consistent with colours, because a sudden change in colours can change

symbolic meaning. If little inconsistency appears, people start giving meaning to it other places as well and then, they start to doubt it. Try to avoid it.

- Evaluation:
 1. We used the Apple Watch design resources and Apple's human interface resources to develop RefLevel's user interfaces. Nonetheless, the user interface was designed to support the same mental model of Android and Apple users.
 2. In the design we showed to Morten Lund, extra time was always displayed under the match time on the main screen. We followed his suggestion and removed the extra time from the main screen. The extra time will only be displayed when the main match time is over.
 3. We did not do any use case scenarios and therefore did not identify what can go wrong before, during, and after a football match. Use case scenarios should be prioritized in the future of SportsLevels.
 4. Colour consistency was fixed right away.
 5. We noticed that headlines on each subpage were pointing to the current subpage and not the previous page. This was incorrect and therefore changed.
 6. Morten Lund suggested several other things, these can be found in Appendix C (p. 154).



Artboard 12



Artboard 1



Artboard 7



Artboard 2



Artboard 8

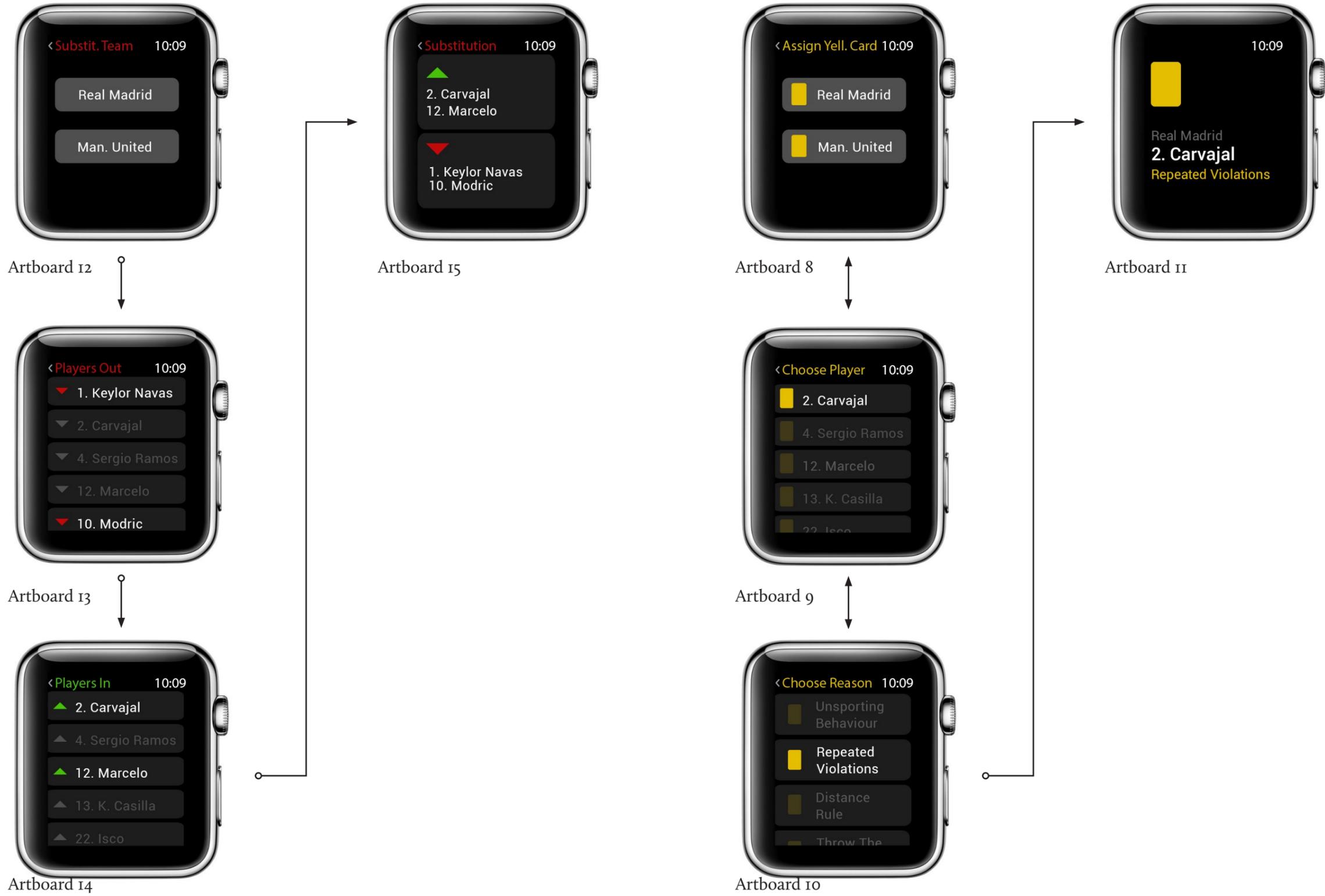


Artboard 3



Artboard 16

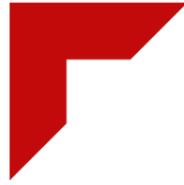




Current smart-watch design 2



Figure 32: Smartwatch design 2



Artboard 9



Artboard 10



Artboard 11



Artboard 5



Artboard 6



Artboard 7



Artboard 8





Artboard 1



Artboard 2



Artboard 3



Artboard 12 a

We did not yet figure out which Game Log is more easier to use if it is Arboard 12a or Artboard 12b.



Artboard 12 a
This is also Game Log, but here a referee gets more information here.

- or -



This confirmation screen will be shown if a referee double clicks on a previous screen.

4.

- 7/4 - 2018
- Test with grassroots referee
- P. Eriksen in a real match

As mentioned previously, some referees asked if they could try out RefLevel in a real match. Peter Vestergaard Eriksen, an Aarhus grassroots referee was one of them. He invited us to one of his matches in Randers, so he could try RefLevel. At this point of time, we still had the old design for smartwatch (p. 60 - 64), not the one displayed on previous A4 pages.



Figure 33: Peter Vestergaard Eriksen

However, we were able to test the phone interface. Before the match the grassroots referee was asked to create a match on a phone and synchronize it with watch.

- The plan was to test if the first iteration of the phone user interface made the app more intuitive to use. Furthermore, test if a referee knows how to synchronize a created match

from a smartwatch to mobile.

- The testing method was a thinking aloud test with video recording and observation. At the same time, we tested RefLevel in real football match.
- The desired result was to identify if, and where does a referee have problems with creating new matches and synchronizing the data.
- Questions:
 1. Is the advanced settings menu understandable for a user?
 2. Where is the phone app not intuitive for a user?
- Answers:
 1. Peter did not completely understand the “Advanced settings” menu and needed an explanation for “Yellow and red card countdown”, “Advanced substitutions”, and “Advanced goals”.
 2. When creating home and away teams, the user only typed the names of the home and away teams but skipped adding numbers and names of players.
 3. After adding the team names, the user was asked to open DBU app, so he would be able to type in correct numbers and names into RefLevel. However, it took him too long and we decided to do it for him. At this point of time, RefLevel was completely dependent on manual input of all data (match date, match time, duration, player lists, etc.)
 4. The test user refused to use RefLevel, if he would have to enter the players’ lists himself. It would take too long time for him. On the other hand, he suggested, that he would use RefLevel, if the information automatically came from DBU.
 5. The test user was asked to type one player in for each team. Nonetheless, he started typing player information under a wrong team name and he did not notice it.
 6. After match creation process, the user was asked to synchronize the

match. He clicked on the match tab in overview, but nothing happened. Then he was asked to swipe in order to synchronize. He swiped in wrong direction and deleted everything he typed in and was asked to go through match creation process again.

7. The user was not familiar with smartwatches. He did not know how to open RefLevel on the Polar smartwatch and needed an explanation, how to access RefLevel.
- Evaluation:
 1. Since users, also in previous tests, did not understand what we mean by the

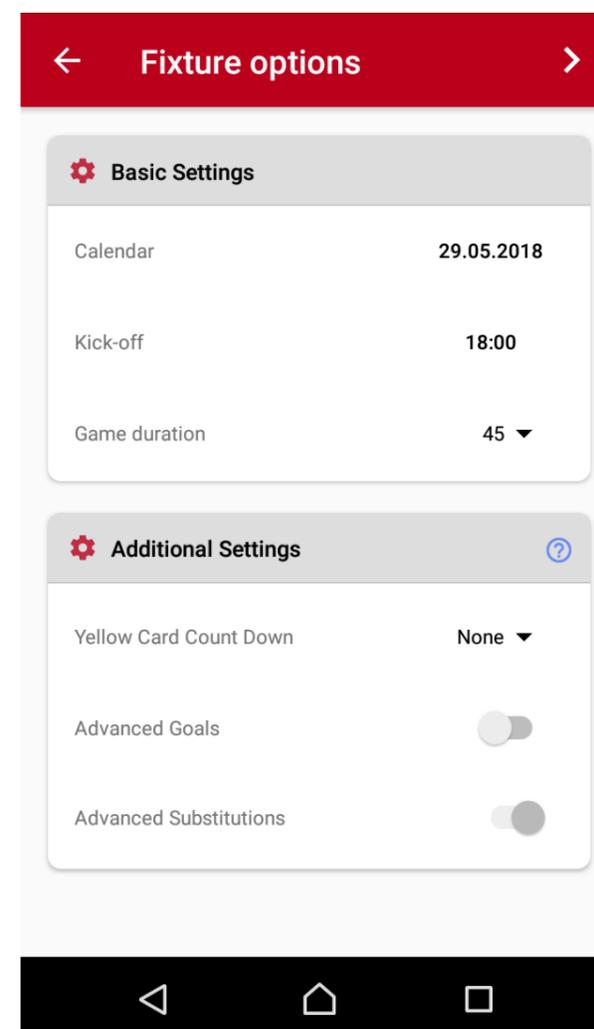


Figure 34: Mobile interface without explanation for Additional Settings

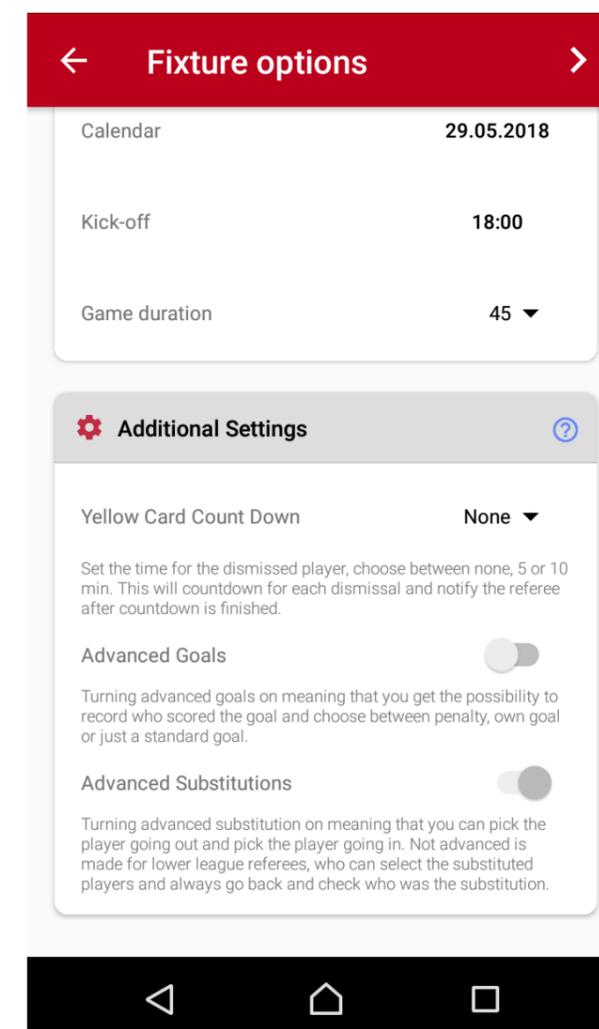


Figure 35: Mobile interface with explanation for Additional Settings

term “Advanced settings”, we decided to rename it to “Additional settings”, and to include a small blue question mark symbol with explanatory text under each term in the “Additional settings”. This explanatory text will only be shown if a user clicks on the question mark icon (Figure 34) and then click again to hide it. The Figure 35 shows it.

2. The test user skipped adding player numbers and names, the only thing he typed in were team names. This is an issue, we are aware of and would probably solve it by splitting team lists

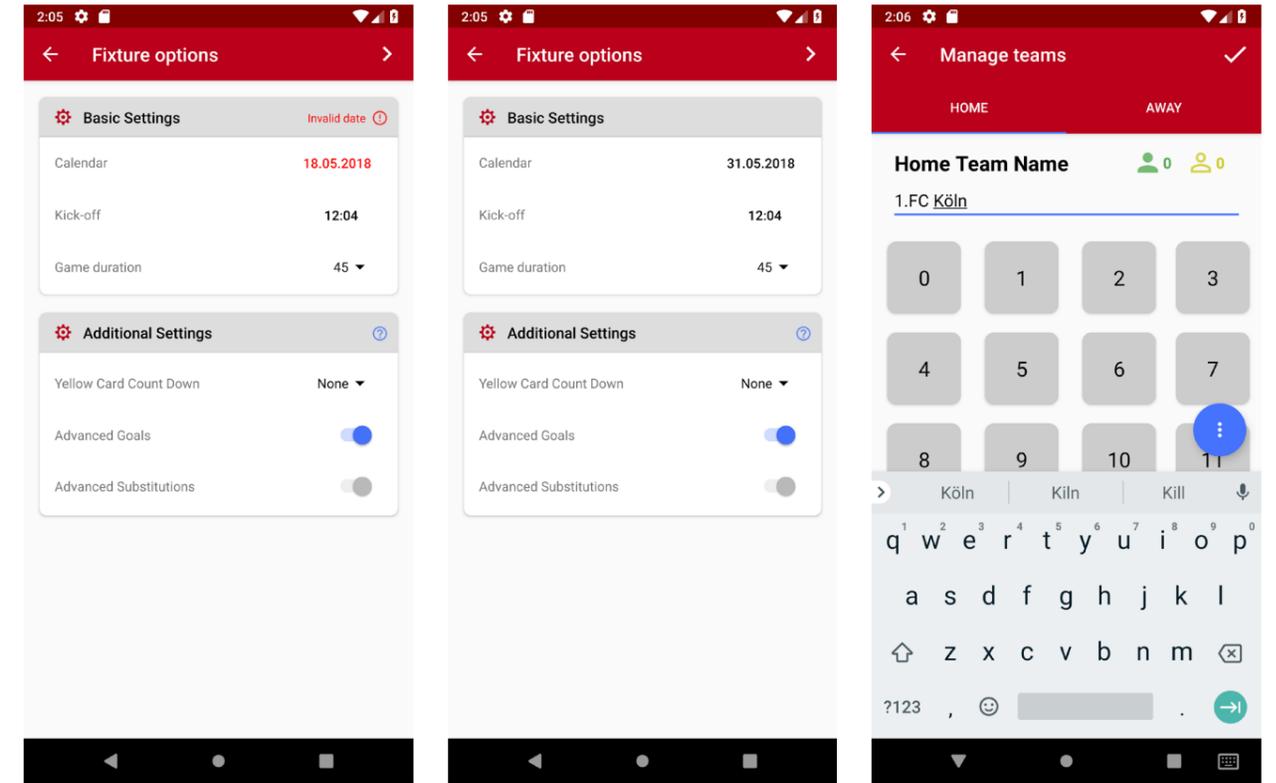
into two separate screens instead of using tabs.

3. For this user test, we did not burden the test user with creation of players' lists and did the tasks for him. Yet, we once again understood that without automated players' lists, RefLevel is much less attractive, if potential customers refuse to add players manually. Their scepticism is understandable, because players' lists contain 20 names per team, so 40 in total.
4. At this point of time, we are negotiating with DBU because without their API's RefLevel will have harder time moving on Danish market.
5. As mentioned in the questions, the

user accidentally did not synchronize but deleted the match instead. We solved this by adding a confirmation screen before a match is deleted.

6. Since the user was not familiar with the usage of smartwatches, we could see that other users might not be familiar either. To solve this, we created a prototype of a user guide. This guide was never tested or worked on but will be shown later on in this chapter.

After testing the mobile interface with grassroots referee Peter Vestergaard Eriksen, we adjusted a few things. Notes from this test can be found in Appendix D (p. 155). The current version of RefLevel can be seen bellow (Figure 36).



Current phone design

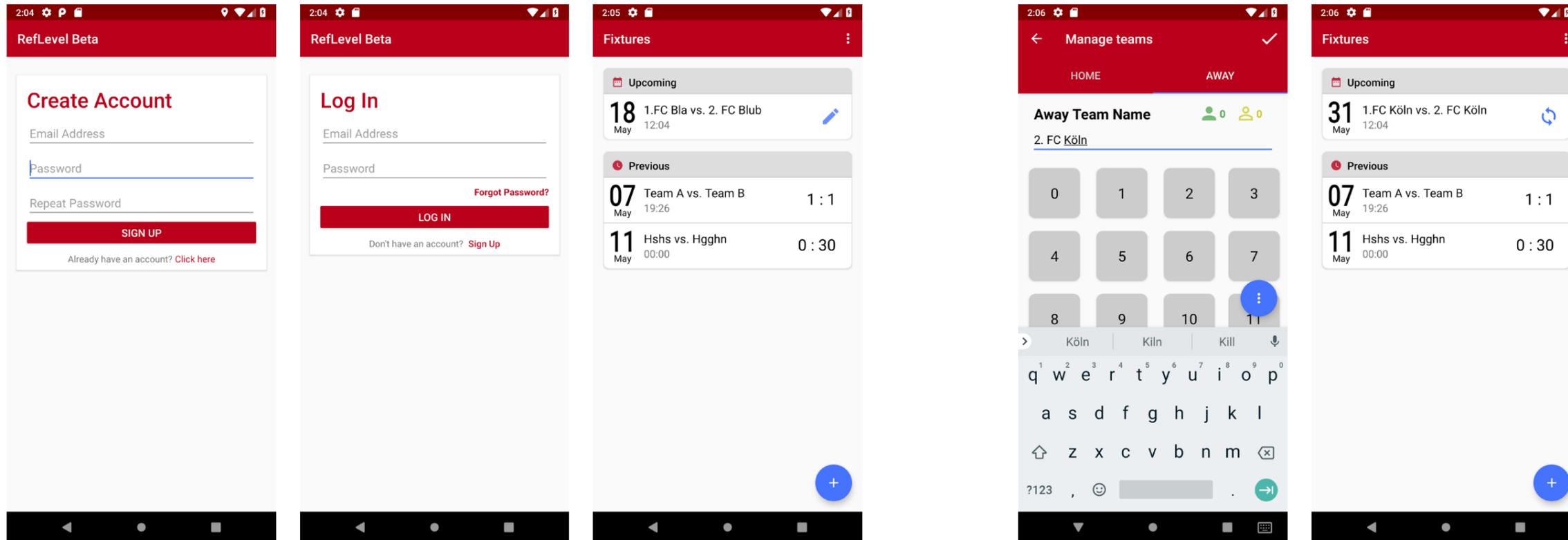


Figure 36: Current phone design

The same day as we tested the phone interface in a thinking aloud test, a grassroots referee Peter Vestergaard Eriksen used our smartwatch during a football match.



- The plan was to attend Peter Vestergaard Eriksen's football match and find out where the smartwatch interface needs improvements.
- The testing method was observation of the match, and a very short questionnaire after the match, because Peter did not have much time.
- The desired result was to identify bugs on the smartwatch interface.
- Questions:
 1. Can a test user use the watch during a stressful situation?
 2. Is RefLevel reliable at the moment?
 3. If not, how can we support the test user in performing refereeing tasks even better?
- Answers:
 1. The user can use the watch during stressful situation. However, a technical bug occurred. The user started a match, and after 2 minutes he looked at the smartwatch, and the timer showed the right time, but when he

looked at the smartwatch after 30 minutes the smartwatch showed that only 3 minutes passed. But in real time they were playing for 30 minutes.

2. When picking a player for a yellow card, the test user prefers scrolling through a number list over a name list.
3. He suggested that the watch send vibration reminders during the half time, so he does not forget to start the second half.
4. For this user test we used Polar smartwatch with a fairly small display. The test user had problems to see yellow colour on a display when the sun was shining on it.

- Evaluation:

1. We fixed the technical bug, so the watch showed the correct time.
2. In the newest version, a referee does not need to scroll only through players' names, numbers are shown right next to names (p. 69, artboard 10).
3. We noted his suggestion about vibration when pausing a match and will implement it.
4. The user had problems to see the yellow colour on the smartwatch display. We did not find solution, nor fix this yet, because it could be a hardware specific problem.
5. RefLevel seemed reliable in some areas. However, it needed further development.

5. — 12/4 - 2018
Test with grassroots referee
K. Kvist

The next user test, still in the learning loop two, was with Kenneth Kvist. He is a grassroots referee from Aarhus. He was one of the first referees we made user tests with and he still helps us with his feedback.



- The plan was to show a low-fidelity prototype of the smartwatch interface and let the test user perform certain tasks.
- The testing method was a thinking aloud test and observation.
- The desired result was to see if the test user understood how to navigate through a low-fidelity interface. That was our intention, but since the user has seen the low-fidelity smartwatch interface before he could not spot the difference from previous design. Therefore, we explained to him what was different from the previous version.
- Questions:
 1. Can the user figure out how to use the smartwatch interface under not stressful conditions?

- Answers:

1. Kenneth did not see any problems using the smartwatch interface in normal conditions, inside an office.
2. He suggested, that instead of swiping to an extra screen in order to pause a match, he would like to have this function directly on the main screen. He suggested, that when clicking on the timer, a match could stop. Clicking on the timer again, a match would start.

- Evaluation:

1. The pause button is working now, but it might be still an area which we could design to fit our users better. We would have to figure out the best approach where to place it. In the future, a split test where one group of referees tries A (pause button on another screen) and another group tries B (pause button appears when a referee clicks on a match time) could be interesting. These groups could be observed while testing pause function, and the one who seems to interact more naturally should be chosen as a leading group for pause button design. Or the team could look into how experts do it and read gesture related literature.
2. At this point, we started to have too many user tests and somehow were not able to track all learnings. Learnings did not lead to change anymore, and therefore we redesigned our test methodology by introducing a new reflection template. The template for this user test is in Appendix G2 (p. 160). The template for the user test with Peter Eriksen, is also in Appendix G, G1 (p. 159).

8.



22/4 - 2018

Test with elite referee



N. Pedersen in a real match

Few days after the test with Kenneth, we made a user test with elite referee Nikolaj. He is a young elite referee with ambitions to get into FIFA. We got in touch with him through our poster campaign and were invited to his match in Hjørring. Unfortunately, due to lack of time and human resources we were not able to evaluate his feedback on the app yet.

9.



28/4

Test with referee, referee developer M. Wachowiak in a



real match

On 28th we made a user test with Danish referee Michael Wachowiak who is 57 years old, ambassador in DBU Jutland, chairman for the referee football club Djursland, and referee developer in Jutland. Besides refereeing in Denmark, he has a refereeing license in Germany and Norway, where he has been refereeing for more than 20 years. We got in touch with him through a poster we made (Appendix F, p. 158). He wrote us a message and requested to try RefLevel life in a real football match. This test did not go as planned, because we scheduled it too tightly and Michael did not have time to answer our questions before or after the test. We were able to take notes:

1. Michael Wachowiak generally thinks that the app is not that easy to use. (mobile)
2. He is missing the functionality to choose team colors.
3. He wants to use it as referee developer

as well and has his own ideas to how RefLevel should work.

4. He would like to have a smartwatch if we pay it (only round smartwatch).
5. It takes too long for him to input player names manually, so he does not want to do it.
6. He has connections to German referees and he has a German referee card.
7. Michael knows a lot of referees in Norway.
8. He would like to help us with testing RefLevel and finding some new referees.
9. When using the mobile app, he forgot to type in team names.
10. He easily understood that clicking on the match means he can edit it.
11. He did not understand what advanced goals or substitution means. (mobile)
12. The smartwatch worked the first half worked as expected, without any problems.
13. The second half failed, because the match time on the watch stopped working.

As mentioned, we were able to attract so many new test users, that we were not capable of implementing all the new learning. Some of the things mentioned in evaluation part of the previous tests apply for this test as well. E.g. we made an explanatory text for “Advanced goals” and “Advanced substitutions”. Moreover, we fixed the bug that caused the app to crash in the second half of a match. We thought about Michael Wachowiak and his request to buy him a smartwatch. He looks like a person with lot of connections outside of Denmark which could be beneficial once RefLevel exceeds Danish borders. This was the reason why it would be clever from us to buy him a smartwatch. On the other hand, we do not see it as SportsLevels task to buy users smartwatches. As a software service for the smartwatch platform, RefLevel’s success depends on the fact that this platform is accepted by the customer independently of us. However, people in charge of RefLevel did

not take any decision. In hindsight, this inability to take decisions can be viewed as SportsLevels’ weakness. It is not according to Lean principles, but it is better to make a decision and be clear about reasons for it, then not to make any and let an opportunity slip by. We are not there yet as an organization and have to learn to take calculated risks and opportunities if they present themselves in future. These two extensive loops sum up our tests we have done with grassroots referees.

7.

18/4 - 2018

Observation of referee developer job with M. Marcussen

Leonora Hedegaard, who is a graduate anthropologist and occasionally works for SportsLevels, has managed that we can observe elite referee developer Mikkel Secher Marcussen throughout his entire journey. A referee developer is a person who attends football matches to observe, take notes, and evaluate a referee’s performance during a football match. The results are reported to DBU in order to make decisions about promoting referees. The journey when observing elite referees looks like this:

Before the match – The referee developer has 15 minutes talk with the elite referee team. The talk is mandatory. The elite referees can express their wishes about what the referee developer should focus on e.g. their body language, running pattern etc. In this talk the elite referees decide if the referee developer gets connected to their headset conversation during a match. Afterwards, the referee developer takes a seat in the press area which ensures good view.

During the match – The referee developer uses a special note block. This note block has double pages. On the left side is a football field, and on the right side is space for notes. These notes include a

time stamp and the observation. The referee developer will underline 3 occasions where the referee needs to improve, and 3 occasions which were positive about his performance. Yet, sometimes, “Black & White” mistakes happen during a match. A “Black & White” mistake is an instance when a referee clearly acts against the rules and thus is not just a suggestion to improve performance.

After the match – The referee developer again engages in a talk with the referee team. Finally, when the referee developer is home, he can open either DBU’s website or “Fodbold” app. He has to copy all the notes from his note block to DBU’s digital form and send it to DBU.

Mikkel Secher Marcussen does not see the necessity in transcribing his notes from the note block to the form. He would like to have an app to take notes, so after the match his notes get send to DBU automatically.

We took all this into consideration, and this was definitely a valuable meeting, which showed other perspectives on football and maybe future possibilities of RefLevel. However, we were and still are focused on developing RefLevel as a solution for grassroots referees and therefore we cannot divide our forces to start a new project within a project.

These are all the tests we managed to do this semester. Among other things, in this chapter we covered the last part of Start phase - Experiment from The Lean Start-up book. In the next paragraph we will describe the second part of The Lean Start-up book – Steer, in which we will guide you through Leap, Test, Measure, and Pivot subchapters.

Part 2 – STEER

Leap, test, and measure

Theory: In “The Lean Start-up” Eric Ries writes, that ideas in start-ups are turned into a product and data gets generated each time customers interact with the product. This data or customer feedback can be qualitative (what customers do and do not like) and quantitative (how many people use the product and find it valuable). The outcome of a start-up’s experiments is a concept around which a start-up can build a sustainable business. Ries continues with the Build-Measure-Learn feedback loop, which consists of hypothesis a start-up has to test. There are two most important hypothesis, one is the value hypothesis and the second is the start-up’s ability to grow. These control a start-ups engine of growth. Then a start-up has a leap-of-faith. This is based on assumptions a start-up has which are tested with a minimum viable product (MVP). An MVP is a product which requires a minimum amount of effort and the least development time to test a specific assumption. Hence, an MVP is not a finished product and can miss features. Instead of a product, it should rather be seen as a tool through which a start-up can measure its impact. A matrix is used to measure the outcomes of a start-up, but it is important to use actionable data instead of vanity data. In regard to measuring, Ries has the habit of asking start-up, if they are making their product better. Since the answer is always yes, he continues: “How do you know?”. The typical answer from start-ups is, that they have made some changes on a product and customers seem to like them (Ries, 2011, p. 115 - 116). However, start-up is moving forward but this is a poor indicator of how much progress do they actually make. Therefore, a start-up has to engage in innovation accounting. This is divided in three steps:

1. Usage of MVP to establish real data where a company is now
2. Attempting to tune the engine (product, processes) from baseline towards ideal
3. And reaching a decision point of pivoting or preserving

In Use: In the previous chapter we made a lot of user tests, from which RefLevel got customer feedback. We got a lot of qualitative feedback (what customers do and do not like) about RefLevels features. At the same time, the same test users found RefLevel valuable and were looking forward to using it. In spite of their interest it was not tested if they would actually buy the product. This could be tested in the future. The idea is, that every time SportsLevels members make a user test, they could in the end of it ask a test user/referee if he would like to sign up on a waiting list for the product, once it is completely ready. The disadvantage of such a test could be that referees find better solution than RefLevel and switch to it while RefLevel is in development phase, but the advantage on the other hand is that SportsLevels would have a list (sign up also through RefLevels website) of potentially interested customers at hand when the product is completely ready and can test interest in the product before it is fully finished. Moreover, in case that referees were involved in a product development and SportsLevels even advertises it, then referees can end up feeling that it was them who designed the product. Therefore, they might act as ambassadors, which would result in a sticky growth engine.

The sticky engine is best suited for companies which are interested in retaining their customers for a long time. Ries emphasizes that this growth engine relies on churn rate reduction, so the result will be sustainable growth. To achieve this, it is important to keep all customers satisfied with the service. SportsLevels would need to ensure, that the product lives up to expectations of potential customers, so they can promote it among their peers and feel proud of it.

Next, Ries mentions the Build-Measure-Learn feedback loop, which we implemented. First, we built a prototype, then measured qualitative feedback of test users and finally learned from it for the next learning loop. In total we went through

two extensive learning loops. However, it is up to discussion to which extent we used the concept of an MVP. Besides the low-fidelity user interface mock-ups on paper, we always tested features after fully implementing them in the real product. For example, there was the idea of simulating automated data transfer to and from DBU for some selected users. This way, we could have tested the value of such a feature before spending months of negotiation with DBU and many hours of programming. Unfortunately, this idea found no sympathy by some team members, got killed, and many hours of work have gone into the development of a feature that sounds plausible, but ultimately is based on an untested assumption. In contrast, releasing RefLevel on Google Play Store impacted our learning process very positively, as we started to get hints, questions, and feedback from referees all around the world who downloaded the app and used it. Some of them were asking questions about features, which RefLevel does not cover yet, others gave us suggestions how to improve existing features. Their actions can be seen as a proof, that even without advertisement there is interest in concept RefLevel offers. Even more so, since referees from outside of Denmark (who will not have the automate feature in near future) are downloading the app and spend time on contacting us in order to give us their feedback. The public releases also offer qualitative data for the first time, as it is possible to track the downloads and the user action in our Google dashboards. In the beginning of this semester we had 16 downloads, in the end we had 61 downloads. Ries, in his book argues that the number of customers can be a poor indicator of start-up’s actual performance, and that it is a vanity matrix. In order to

avoid a vanity matrix, a start-up needs to apply a funnel and cohort metrics. Funnel metrics tracks a behavior that is critical for a start-up’s engine of growth. This includes customer registration, the number of downloads of RefLevel, repeated usage and eventually purchase.

This subchapter described the product development process in the start-up company SportsLevels and was framed by “The Lean Startup” by Eric Ries. The next steps to improve learning are creating funnel metric and cohort metrics. A cohort analysis observes a group of new customers which started using the product in the same time frame. For each week that passes by it is shown how many users in this group are still actively using the product. Both, funnel analysis and cohort analysis require a certain maturity of the product, but Google’s Firebase (the database RefLevel uses) offers great support in implementing such features. In the future, SportsLevels representatives have to figure out what to do next. If they should preserve or pivot. This will be not elaborated on in this report since more real data is needed in order to figure out if RefLevel should pivot or keep in same direction. In the next chapter we will describe if and how SportsLevels can be seen as exponential organization. First, we will introduce the concept and then elaborate on our ability to be such an organization.



3.2 ExO characteristics in SportsLevels

Chapter 3.2 deals with WQ 4 “What are the characteristics of an Exponential Organization and how to implement these characteristics in SportsLevels?”. The chapter is framed by the book “Exponential Organizations” (Ismail, 2014), because the lead author Salim Ismail has “spent many years researching and developing insights about this new paradigm in organizational design” (<https://exponentialorgs.com>) and the book has become the #2 best seller in the category startups on amazon and is in the fortune top 5 business books of 2015. In the start of the book,



Figure 37: Salim Ismail

Salim Ismail states that the first time he thought about exponential organizations (ExOs) was at an organization called Singularity University. This “university” was founded in 2008 by Ismail in cooperation with the entrepreneur-turned-AI director at Google, Ray Kurzweil. Their thought was to create a “university” (without a research department), whose curriculum was continually updated, because in today’s world the only certainty is the change. Thereafter, the author makes sure to mention that the book is not a theoretical contribution but rather a conceptual one, which yields entrepreneurs’ hands-on approach on how to create and maintain an ExO in the world of constant change. Nevertheless, the book is based on interviews with C-Level executives from several dozen Fortune 200 companies, interviews or researches of ninety top entrepreneurs, and investigation of characteristics of the one hundred most successful start-ups around the world.

Ismail introduces the concept of ExOs to the reader by stating the definition: “An Exponential Organization (ExO) is one whose impact (or output) is disproportionately large - at least 10x larger - compared to its peers because of the use of new organizational techniques that leverage accelerating technologies.” (Ismail, 2014, p. 18). The 10x larger impact compared to a linear orga-

nization (the difference will be explained in the next paragraph), is possible due to the fact that ExOs are not built upon materialistic goods but instead, ExO accesses valuable caches of already existing information and access resources they do not own (Ismail, 2014, p. 47). However, Ismail is neither the first nor the only one who studies exponential growth. As early as in 2005 Ray Kurzweil, inventor, entrepreneur, and visionary, explains the exponential growth in a TED2005 video named - The accelerating power of technology (Kurzweil, 2005). He states that “Information technology

double its capacity, price performance bandwidth every year. And that is a very profound explosion of exponential growth.” He also mentions Gordon Moore’s law as a part of a paradigm and states that if one paradigm runs out of steam, then a new one takes its place. So, in his vision, Moore’s law is one of many examples of exponential phenomena. It is basically a property of the evolutionary process of technology. Later on, in the video, he gives an example of double exponential growth in his job at MIT where it took three years to double their price performance of computing in 1990. However, in 1997 the same price performance of computing took only two years, while now it is doubling every single year.

HISTORY OF MOBILE PHONES AND APPS

Nonetheless, an example to which we can relate closest to us is probably the example of smartphones. In 2000 the first mobiles were introduced which could do more than only make a call. In his 2016 App-Design book (Semler, 2016), Jan Semler writes that this development had a climax when Apple introduced the iPhone in 2007, featuring a whole new design which uses the entire screen for

input by finger touch. For the first time, mobiles became compactly designed, hand held computers (Semler, 2016, p. 15). Semler sees the Apple’s new interface as design change and product innovation. In 2008, one year after Apple introduced the App Store, which is the base for today’s vast amount of third party apps available. In the book “The Disruption Dilemma” Joshua Gans argues that Apple’s interface should be seen as the new dominant design in mobile handsets representing a disruptive event rather than just a particular product innovation. Gans goes on and explains why new entrants (such as HTC, Samsung, etc.) did better in adopting to the new architecture than incumbent companies. Among other things, the reason why Apple did better, was due to the inability of incumbent companies to see Apple’s design as an architectural change rather than a component one. Architectural innovation was discussed earlier in chapter 2 (p. 40). Back in 2007 Nokia was a very successful mobile company. In hindsight it is easy to see the advantages of Apple’s new design, but back then it was not obvious whether Apple’s design was superior. Nokia decided to stay with their own mobile design instead of adapting to what Apple had shown the world. Today it is obvious that this decision was a huge mistake, as the diagram (Figure 38) below shows. Regarding design and functionality, Apple’s ap-

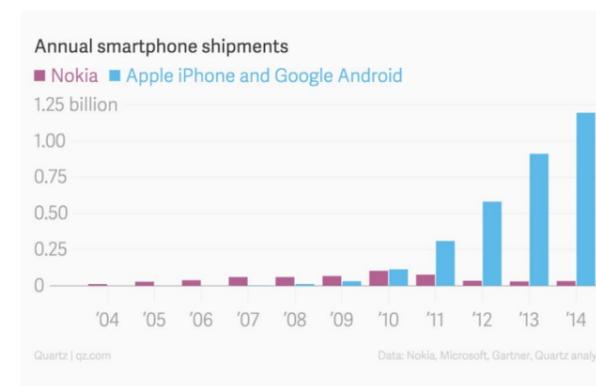


Figure 38: Annual smartphone shipments Apple vs. Nokia (Frommer, 2015)

proach changed the interaction diversity on mobiles, because mobiles could change the interface depending on what action a user was about to perform. This constituted the concept for touch-screen-based mobiles as we know them nowadays. They were no longer limited by a small screen. Instead, it was possible to install dozens of apps of choice. More importantly for this project though, the interaction expansion on touch screens and apps laid the foundation for new possibilities, such as tablets and later on smartwatches.

According to the “International Data Corporation (IDC) Worldwide Quarterly Wearable Device Tracker” (International Data Corporation, 2017) report from December 2017, the overall wearables market (including basic wristbands, basic watches, and smartwatches) is expected to grow as more vendors – particularly fashion brands—and features like cellular connectivity help to drive growth in this category.

Under the term “basic wearable,” (Figure 39) we mean electronic devices with embedded sensors that can receive data about the human who wears them or/about surroundings. In other words, basic wearables are devices which are defined as those devices that do not run third-party apps.



Figure 39: Example of a basic wristband, a basic watch

A ‘smartwatch’ (Figure 40) in this instance is a computer in much the same way that a smartphone or a tablet is a computer, which has been made so small it can be worn.



Figure 40: A smartwatch

The before mentioned IDC’s report from 2017 is not the most

recent one, but we decided to include it anyhow because it illustrates the current fashion trend in the wearables market. The more recent version of the report from March 2018 is elaborated in the next paragraph. The 2017 report predicted the trend of fashion brands entering the smartwatch market, which now also became visible on Danish websites like ELGIGANTEN, where new players such as Emporio Armani, Fossil, and Michael Kors compete against tech companies like Apple, Samsung, and Huawei. The fashionable watches tie tasteful design with technical features into one unit, designed to fit various target groups. As these and other new brands emerge and aim for market share, we assume that this market will be more divided and expand in upcoming years

also thanks to fashion brands and their influence on mainstream customers, who search for an intermediate of technical features and attractive design as a symbol of status.

The more recent IDC report from March 2018 (Figure 41) suggests that: “Worldwide shipments of wearable devices are on track to grow 15.1% in 2018, totalling 132.9 million units over the course of the year. The overall market is also expected to deliver a compound annual growth rate (CAGR) of 13.4% over the next five years, culminating in 219.4 million units shipped in 2022, according to the International Data Corporation (IDC) Worldwide Quarterly Wearable Device Tracker. With cellular connectivity on the rise and shifting consumer preferences, IDC believes smartwatches will ac-

count for almost two out of every five wearable devices shipped in 2022.” (IDC, 2018) The senior research analyst for IDC Mobile Device Trackers, Jitesh Ubrani, says that “At present, fitness uses lead by a mile, but mobile payments and messaging are starting to catch on. The addition of cellular connectivity is also starting to resonate with early adopters and looking ahead the emergence of new use cases like music streaming or additional health sensors will make cellular connectivity pivotal to the success of the smartwatch.” (IDC, 2018)

To visualize IDC’s forecast, the first chart on the left (Figure 41) shows IDC’s current market prediction for basic wearables and smartwatches. Dark blue colour indicates shipments of “basic / traditional” watches, while light blue colour, on the top of dark blue, indicates number of “smartwatch / small-scale worn computer” shipments.

A few paragraphs above, we introduced the concept of an ExO. In this paragraph we will define linear organizations, the opposites of an ExO. To understand the ideas on which linear organizations were built, we look back in history. If a person wanted to be influential, he or she had to own assets. This included land, people, and after the industrial revolution (1760) also machines. The more assets a person owned, the more he needed to protect and manage them. From this need to manage assets arose hierarchies, scalable efficiency and it stuck with most companies until nowadays. This scalable efficiency was achieved by adopting large-scale push programs. Driven by forecasts of demand, push programs required highly standardized and rigorously specified work activities that were closely monitored to ensure predictability. The modern, thick process manual was the end-product. (P2PFWiki, 2018) The problem hierarchies and scalable efficiency suffer from, is that they are not fit for an ever faster changing world because among other things decision processes can get too slow, stiff, and frustrating for employees. It can be seen as following: new ideas mean new decisions and new decisions mean changes. Thus, if employees see an idea, they often question the implications for their work, which

more often than not ends up in resistance towards change. That means ideas are turned down before they can be explored. This is a topic of change management in linear companies which will be not addressed in this report. In order to identify linear companies Ismail lists 10 defining characteristics (Ismail, 2014, p. 41):

1. Top-down hierarchical in its organization
2. Driven by financial outcomes
3. Linear, sequential thinking
4. Innovation primarily from within
5. Strategic planning largely an extrapolation from the past
6. Risk intolerance
7. Process inflexibility
8. Large number of employees
9. Controls own assets
10. Strongly invested in status quo

In contrast to this, Ismail presents the concept of exponential organizations, which are two fundamental drivers that enable ExOs to achieve a rapid level of scalability. These are:

1. “[...] some aspect of the company’s product has been information-enabled and thus, following Moore’s Law, can take on the doubling characteristics of information growth.
2. “[...] thanks to the fact that information is essentially liquid, major business functions can be transformed outside of the organization - to users, fans, partners or the general public.” (Ismail, 2014, p. 52)

MASSIVE TRANSFORMATIVE PURPOSE

To understand the concept of an ExO, the author, explains common traits of ExOs. They include a Massive Transformative Purpose (MTP) (I) and external and internal attributes. For external attributes Ismail uses the acronym SCALE whereas for internal attributes he uses the acronym IDEAS. An MTP is needed for a company to think big.

* Note: All figures represent forecast data.

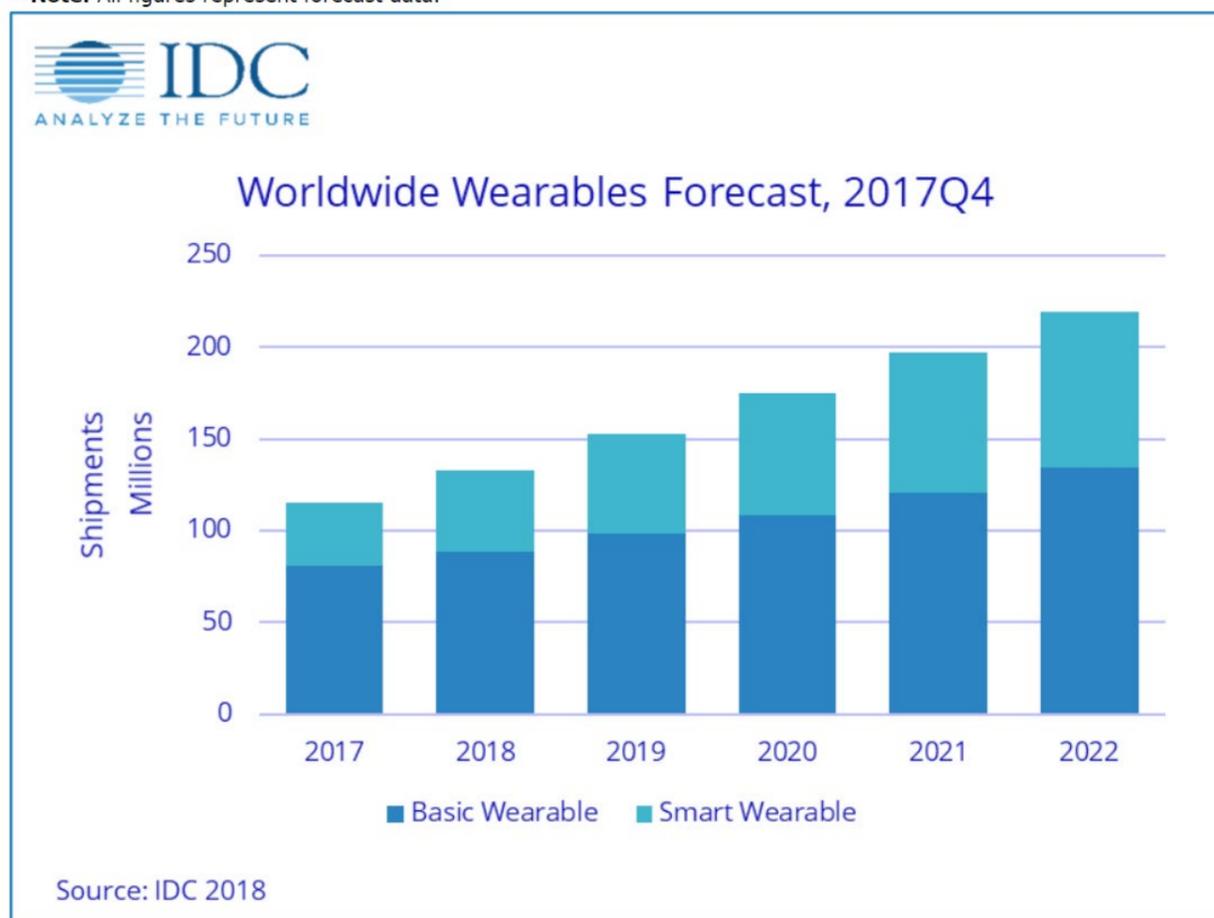


Figure 41: Worldwide wearables Forecast

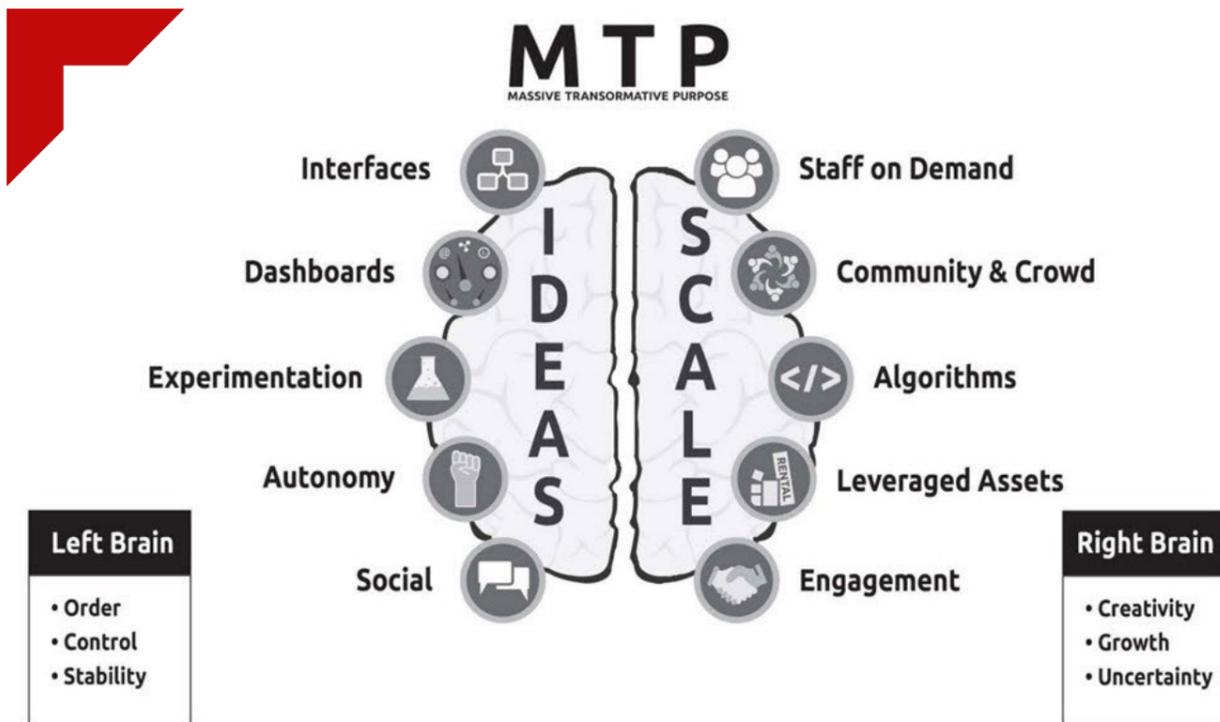


Figure 42: Massive Transformative Purpose

An ExO must have a strong vision for employees to work towards. This includes an aspirational statement. In the case of SportsLevels, we thought about this point and came up with seven possible statements:

1. Transform the way sport is recorded.
2. Connect sport with everybody.
3. Revolutionize / reorganize / reform game management.
4. SportsLevels - connecting spectators, players, and referees.
5. Giving sport a new perspective.
6. Changing sports perspective for you, me and us.
7. Smart refereeing.

A good statement should not be too long but rather short and easy to remember, so we decided to narrow the selection down to two most appealing statements:

1. SportsLevels - connecting spectators, players, and referees.
2. Smart refereeing.

The first statement was chosen because in the future we have the vision to offer space for spectators, including people who are not only fans of specific teams but also people who bet on games. In this way, we can have an impact on over a billion of people worldwide. This statement is general and can fit to any other sports branch such as basketball, ice-hockey, and handball. Moreover, it also includes players, referees, and referee developers which are SportsLevels' primary target group in the near future after the RefLevel product is secured, and on its way to grow in other European countries besides Denmark. All this is to create not only a product for football referees but to have other possibilities in mind that the sporting world has to offer. Then we looked into the second statement "Smart refereeing". - This

statement is rather tight to the product solution, RefLevel, instead of a statement under which a community & crowd can gather and identify themselves with. It has the power needed to pull employees to achieve the goal of refereeing beyond pen and paper. However, it might be short-sighted because it might not appear to the outside bigger world. Therefore, we decided to choose the first statement: "SportsLevels - connecting spectators, players, and referees". This statement does not offer an exact detailed plan how we are going to achieve entry into a sporting world, nor should it give. It has to be aspirational and not aimless. Ismail mentions in the Exponential Organizations book, that statements are even more important for the public because if a statement is inspirational for outsiders they spontaneously begin to form a community, tribe, and culture around an ExO, which is the most important outcome of an

MTP. This is exactly what we are aiming for at SportsLevels. Then Ismail states that, aspirational brands create positive loops in ExO's community: customers feel good about the products and are increasingly proud to be part of larger, virtuous movement. (Ismail, 2014, p. 56)

MTP - SCALE

Next, Ismail continues with an explanation of the external characteristics that define ExO which are:

- S – Staff on Demand
- C – Community & Crowd
- A – Algorithms
- L – Leveraged Assets
- E – Engagement

ICON	ACRO- NYM	NAME	CHARACTERISTIC
	S	Staff on Demand	<p><u>Theory:</u> Staff on Demand is a necessary characteristics for speed functionality and flexibility in a fast changing world. Leveraging personnel outside the base organization is key to creating and running a successful ExO.</p> <p><u>In use:</u> In SportsLevels we have already implemented Staff on Demand. The Android development for example is outsourced to a Ukrainian developer who we found over "upwork.com". The second person we had was Niels, who is also an Android developer. Niels had 30 days internship and after the period was over he decided to continue with a different job.</p>
	C	Community & Crowd	<p><u>Theory:</u> Community can not be viewed as a transaction for ExO but rather as a platform where peer-to-peer transaction occurs. It has three characteristics.</p> <ol style="list-style-type: none"> 1. Usage of an MTP to attract and engage early members 2. Nurture of the community 3. Creation of a platform for peer-to-peer engagement <p>The Crowd is harder to reach. It is made up of concentric people outside of community.</p>



ICON	ACRO- NYM	NAME	CHARACTERISTIC
	C	Communi- ty & Crowd	<p><u>In use:</u> SportsLevels does not have any community nor crowd. Currently, the focus is entirely on finishing the product development, securing a stable position in the Danish market with help of DBU APIs, and creating a strategy on how to enter other European markets. However, SportsLevels plans to create a community along its statement and values (which are not defined yet) in the future. Instead of having a community, we entered a small already existing group of referees in Aarhus Facebook group. We posted there a poster (Appendix F, p.158) with user test request, from which we meet the daily quota of one new test user per day. We wanted to get new test users because mails we sent previously were not answered so we had only two test referees. The new approach improved this dramatically.</p>
	A	Algo- rithms	<p><u>Theory:</u> There are two types of algorithms: Machine Learning and Deep Learning Machine Learning - is the ability to accurately perform new, unseen tasks, built on known properties learned from training or historic data, and based on prediction. Deep Learning - allows the machine to discover new patterns without being exposed to any historical or training data. Algorithms are much more objective, scalable and flexible than human beings, therefore they are critical for ExOs' exponential growth.</p> <p><u>In use:</u> At SportsLevels we considered algorithms but in order to make them sufficient we need to gather considerable amount of data first. Then it needs to be organized, applied, and exposed. At this moment RefLevel does not have enough users to pursue such a task. Nevertheless, we gather data in Google's Firebase.</p>

ICON	ACRO- NYM	NAME	CHARACTERISTIC
	L	Leveraged Assets	<p><u>Theory:</u> Sharing, renting and leveraging assets instead of owning them. For example renting a laboratory for several months can be much cheaper and flexible than actually owning one.</p> <p><u>In use:</u> In April 2018, the SportsLevels had a meeting with Dansk Bold Union. The meeting was vital because if RefLevel should be user friendly, it needs access DBU's APIs. And in the beginning of May, SportsLevels got an approval from DBU to get access to the APIs. However, the actual cooperation and its obligations will be most likely agreed on at the same time as this project will be hand in. We will keep you updated.</p>
	E	Engage- ment	<p><u>Theory:</u> In the digital world, quizzes, coupons, loyalty cards became also digitalized. They are used to create user engagement. A user can receive virtuous, positive feedback loops and engagement with others people who share the same interest.</p> <p><u>In use:</u> Some companies, for example FitnessWorld, incorporate challenges with prizes, personal development, and even training buddies. Maybe in the future SportsLevels can get inspired and create similar rewards for their users.</p>

MTP - IDEAS

As already mentioned, the MTP consists of two parts, the external part represented by the acronym SCALE and the internal part called IDEAS. The IDEAS can be seen as “interfaces” of SCALE. Thus, they are equally important as SCALE. They encompass everything from the business philosophies to how employees interact with one another, how to measure their performance (and what they value in that perfor-

mance), and even their attitudes toward risk – in fact, especially towards risk (Ismail, 2014, p. 85) ExO’s internal mechanisms can be expressed by the acronym IDEAS as follows:

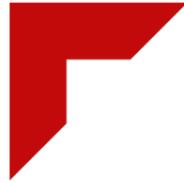
- I – Interfaces
- D – Dashboards
- E – Experimentation
- A – Autonomy
- S – Social Technologies

ICON	ACRO-NYM	NAME	CHARACTERISTIC
	I	Interfaces	<p><u>Theory</u>: Interfaces are algorithms and automated workflows that route the output of SCALE externalities to the right people at the right time internally.</p> <p><u>In use</u>: SportsLevels is in the phase of beta testing RefLevel, therefore a lot of tests are performed. Previously, outcomes of these tests ended up in silence, due to too extensive descriptions on worksheets (Appendix C, p.154). Furthermore, there were disagreements about how much team communication should take place, and whether people without company shares are allowed to make meaningful suggestions. That basically meant poor information transformation from test results to programming task division for the team. We needed a fast and effective way of noting outcomes in a few key sentences. In order to achieve this, we created a custom reflection sheet (Appendix G, G1 - G2, p. 159 - 160). A person assigned to a test had to reflect on the test with 10 positive and 10 “didn’t work” or “to be improved” outcomes of each test. “To be improved outcomes” were then moved into Trello, as tasks to be worked on. Trello is a software program that keeps track of everything, from the big picture to the minute details. Tasks were sorted by RefLevel’s releases (each week on Monday) into sprints, so if one task was not finished it was moved to a subsequent sprint. In this way we kept and still keep track on tasks and people accountable for them. For internal communication we use Synology’s Chat, Drive, and CalDav services. Everyone in the team has access to it either as an app or as a web based solution.</p>

ICON	ACRO-NYM	NAME	CHARACTERISTIC
	D	Dashboards	<p><u>Theory</u>: To be able to measure and manage the organization, ExOs use real-time, adaptable dashboards with essential company and employee metrics, accessible to everyone in the organization.</p> <p><u>In use</u>: We gather data at several places like Google Analytics, Google Play Console and Firebase. These are then linked with BigQuery. It is an Infrastructure as a Service that enables the interactive analysis of massively large datasets. (Wikipedia, 2018) BigQuery is for big data and we do not need it at the moment. Instead, it is a pure technical step because Google has not made a direct connection between Firebase and Google Data Studio, where we can create our custom dashboards.</p>

ICON	ACRO- NYM	NAME	CHARACTERISTIC
	E	Experi- mentation	<p><u>Theory:</u> Experimentation is based on a book written by Eric Ries who is American entrepreneur, blogger and author. The book, Lean Startup, explains how companies should use the Lean approach in order to succeed. A company should build a minimal viable product (MVP), test it with users, learn from early and cheap failure and build an improved version, repeat the process, until this company is satisfied with the test results. The MVP is for early adopters who are willing to tolerate some inconsistencies and bugs but want to stay in touch with newest products. On the other hand, after MVP stage a product has to be improved further for more critical mainstream customers. It is important that a company never stops testing / experimenting their assumptions. These assumptions tend to differ, in regards to where a product is on the S-curve. If a product is in the start of an S-curve the experimentation will answer more fundamental questions. Whereas, if the product is on the end of the S-curve, then it tends to more focus on an incremental innovation. A company should experiment and test their assumptions in every stage of the S-curve in order to be connected with ever faster changing world and demanding customer expectations. Furthermore, it depends in which category of Architectural innovation wants a company to place itself. There are basically two main ways. The first is market leader (100%) and the second option is 80% & 20% solution. 80% focus on a main product and 20% has focus on market capacity and prepare alternative solutions. When a disruptive event happens, they are ready. However, the topic of Architectural innovation in regards to SportsLevels is further elaborated on in chapter 2 (p.40), WQ2: How can the theories of disruptive innovation help to form SportsLevels' strategy?.</p>

ICON	ACRO- NYM	NAME	CHARACTERISTIC
	E	Experi- mentation	<p><u>In use:</u> In the chapter 3 (p. 52 - 81), Lean Principles in SportsLevels, was in detail explained how we use Lean Startup approach in SportsLevels. Nevertheless, SportsLevels can use experimentation in a way that it gives its' employees one day a week to work on self-chosen, creative but still company related task and harness them once a month on a Monday meeting. Monday meeting is a summary of what happened in the company previous week and plan for a next week. Usually, everybody from the team is present. Despite this, SportsLevels does not have an innovation culture and might only exploit the opportunity of RefLevel.</p>
	A	Autonomy	<p><u>Theory:</u> Autonomy can be described as self-organizing of multi-disciplinary teams operating with decentralized authority. It becomes more and more important as the Millennial generation (anyone born between 1981 and 1996 (ages 22-37 in 2018)) enters work market. This generation is armed with Internet and gaming skills, which cultivate entrepreneurial mindset and is increasingly in odds with hierarchical structures. They prefer competence-based hierarchies instead of traditional position-based ones.</p> <p><u>In use:</u> We use autonomy solely when we attend user tests. Then we form a small team whos responsibility is to contact a user, make a test, record it and note down the outcomes. This way results can later be added as tasks to work on in Trello. Autonomy and autonomous thinking are already important now but will be vital when SportsLevels employs new members. However, SportsLevels will shrink after this semester, so the task of creating a play book will be postponed until need for it arises.</p>



ICON	ACRO- NYM	NAME	CHARACTERISTIC
	S	Social Technolo- gies	<p><u>Theory</u>: Social technologies are comprised to seven key elements: Social objects, Activity streams, Task management, File sharing, Telepresence, Virtual worlds, and Emotional sensing.</p> <p><u>In use</u>: In regards to Social objects, in SportsLevels we work in facilities provided by Aalborg University's Incubator. We do not broadcast our Activity streams. The Task management is distributed on Monday meetings and then noted in a software solution Trello. For the File sharing we use Synology Drive. Skype and Team Viewer are used in case we need Telepresence but we do not use a virtual world, since we do not see an application for us. Lastly, we do not use sensors to measure Intelligence Quotient (IQ), the Emotional Quotient (EQ) and Spiritual Quotient. Maybe these can be implemented in the future when we will expand the team.</p>

To determine if SportsLevels is currently an ExO, we adopted Ismail's Exponential Quotient audit. The audit consists of several questions regarding HR and Asset Management, Community and Crowd, Engagement of Community and Crowd, and others. Each of the questions is then rated by a simple system. If a company's processes are linear, then it only reaches 1 or 2 points. On the other hand, if the company is moving in the direction of ExO, then it reaches 3 points. In a case that a company is completely exponential, then it reaches 4 points per question. The total points are 84, and for a company to be an ExO, it needs to achieve from 55 up to these 84 points. SportsLevels currently scores highest in areas such as HR and Asset Management, Social Technologies & Social Business, Community & Crowd. The overall score of SportsLevels at this point is 44 points. In other words, SportsLevels is with some activities

on a good a trajectory to become an ExO. Several other areas, such as Engagement of Community & Crowd, Experimentation & Risk, Autonomy & Decentralization need a considerable amount of improvement. The detailed audit can be found in Appendix H (p.162 - 167).

In this chapter, you could read about Exponential Organization, its definition, and how we use Ismail's book to move SportsLevels into the direction of a modern exponential organization. The chapter started with the ExO definition, prediction of wearables market, and continued with a massive transformative purpose. The brain model, divided into the left, the external and the right, internal part was explained. For the left, external part, the acronym SCALE is used. Equivalent to Staff on Demand, Community & Crowd, Algorithms, Leveraged Assets, and Engagement. On the other

side of the brain are internal aspects. These are how a company should function, how employees interact with one another, how to measure their performance etc. They are represented by the acronym IDEAS or Interfaces, Dashboards, Experimentation, Autonomy, Social Technologies. Each of these blocks was described with a theory introduction and then a practical part. In the next chapter, we will elaborate indepth on uncertainties of RefLevel and the overall Business Model. Step by step, from value proposition over revenue streams to partnerships, it is shown how the different business aspects around the software service RefLevel are implemented in practice.

4 BUSINESS MODEL

CHAPTER IN BRIEF

Chapter 4 describes both Alexander Osterwalder's and Clayton M. Christensen's Business Models and gives examples of how SportsLevels uses them. We choose Osterwalder's Business Model and create a Business Model Canvas for the software service RefLevel.

HALL OF FAME

- | | | | |
|------|--------------------------|------|---------------------|
| 2006 | Michael Laudrup | 2016 | Aage Rou Jensen |
| 2008 | EM 1992 holder | 2016 | Ole Madsen |
| 2008 | Carl Aage Præst | 2016 | Morten Olsen |
| 2008 | Allan Simonsen | 2016 | John Hansen |
| 2009 | Peter Schmeichel | 2016 | Jens Peder Hansen |
| 2009 | Dynamitholder | 2016 | Henry From |
| 2010 | Preben Elkjær | 2017 | Susanne Augustensen |
| 2010 | Harald Møller | 2017 | Lone Smidt Nielsen |
| 2011 | Sepp Piontek | 2017 | Henning Enoksen |
| 2011 | Peter Rasmussen | 2017 | Jørgen Leschly |
| 2012 | Michael Laudrup | 2017 | Karl Aage Hansen |
| 2013 | Søren Lerby | | |
| 2013 | Frank Arnesen | | |
| 2014 | Sophus "Målmand" Hansen | | |
| 2014 | Sophus "Kralben" Nielsen | | |
| 2014 | Richard Møller Nielsen | | |
| 2014 | Paul Pedersen | | |
| 2014 | Paul "Tiet" Nielsen | | |
| 2014 | Pauli Jørgensen | | |
| 2014 | Nils Middelboe | | |
| 2014 | Knud Lundberg | | |
| 2014 | Egil Nielsen | | |
| 2014 | Carl "Skomær" Hansen | | |



4.1 Business model building blocks and RefLevel

After going in depth with how SportsLevels can become an ExO, looking at the IDEAS and SCALE characteristics, and implementing the lean principles, we can finally identify the elements of a Business Model using RefLevel as the service to explore. In this WQ we are going to compare two different perspectives of how to determine the elements of a Business Model, one view is going to be from the book called “Business Model Generation” by Alexander Osterwalder, and the second view is from a book called “Disruptive innovation” by Clayton M. Christensen. We chose Osterwalder’s business model because it represents by far the most successful approach, and the breakdown in 9 building blocks fits very well with our practical experience. In our experience, Christensen’s business model is less suitable as a guideline for setting up

your own start-up, but we really liked the strong focus on the customer value proposition and the more tangible cost accounting as a supplement to Osterwalder’s business model.

Before we can create a Business Model, we need to identify and understand the different elements of a Business Model. According to Alexander Osterwalder the aspects of the Business Model can be described as nine building blocks covering four main areas of a business: Customers, offer, infrastructure, and financial viability (Pigneur, 2010, p. 15). The nine blocks consist of customer segment, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partners, and cost structure. The figure below shows the nine blocks put on a table which is called Business Model Canvas (BMC).



Figure 43: Business Model Canvas (Pigneur, 2010, p. 44)

BMC is a strategic management and lean start-up template for developing new or existing Business Models. During this chapter, we will describe how each element of the BMC works with examples and describe RefLevel in a BMC. In the book (Pigneur, 2010), Alexander Osterwalder uses Apples iPod/iTunes Business Model as an example, where he

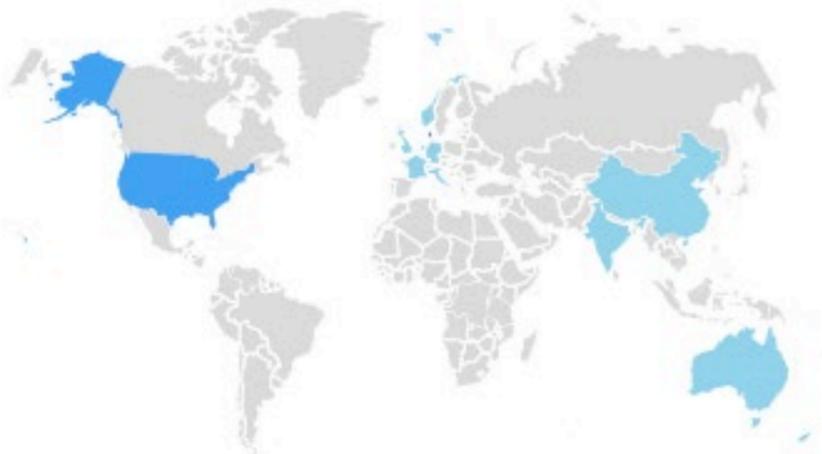
compares Apple’s media player with other media player companies like Diamond Multimedia and explains the reason for Apple’s enormous success is because of their better Business Model. Let ‘s identify the nine blocks of a BMC and use RefLevel to describe the nine blocks in detail instead of iPod/iTunes.

Business Model Canvas

BLOCK NAME	DESCRIPTION
Customer Segment	<p>Theory: The first element is Customer Segment Block, which defines the different group of people or organisation an enterprise aims to reach and serve (Pigneur, 2010, p. 20). In this block a company needs to identify its customers, this can be done by finding peoples’ needs and wants. By this one can create a product for the customers.</p> <p>In use: RefLevel’s Business Model is targeting the sports management industry, which means that RefLevel is targeting sports like football, ice hockey, handball, etc. RefLevel is segmented, which aims different sports with different needs and wants, but this is in the future for RefLevel, today we are trying to focus and get a foothold in the football game management for football referees. Football referees are split up into different levels, elite referees who are in charge of refereeing at the highest league, and grassroots referees for the lower leagues. For both levels, there are different needs and wants. If we look at how our customers spread since RefLevel went live with the app since November 2017, we see that more than 50% are users from Denmark, and United States are following up with a bit more than 20%. Denmark is the test market and the market where we want RefLevel to get a foothold. But it does not mean that we cannot let other users from other countries use the app and try to get some ambassadors from other countries, so when we are ready to go to other countries, we already have active users and collecting data from that country. An example of this can be found on the next page (Figure 44).</p>



Location ?



Country/Region

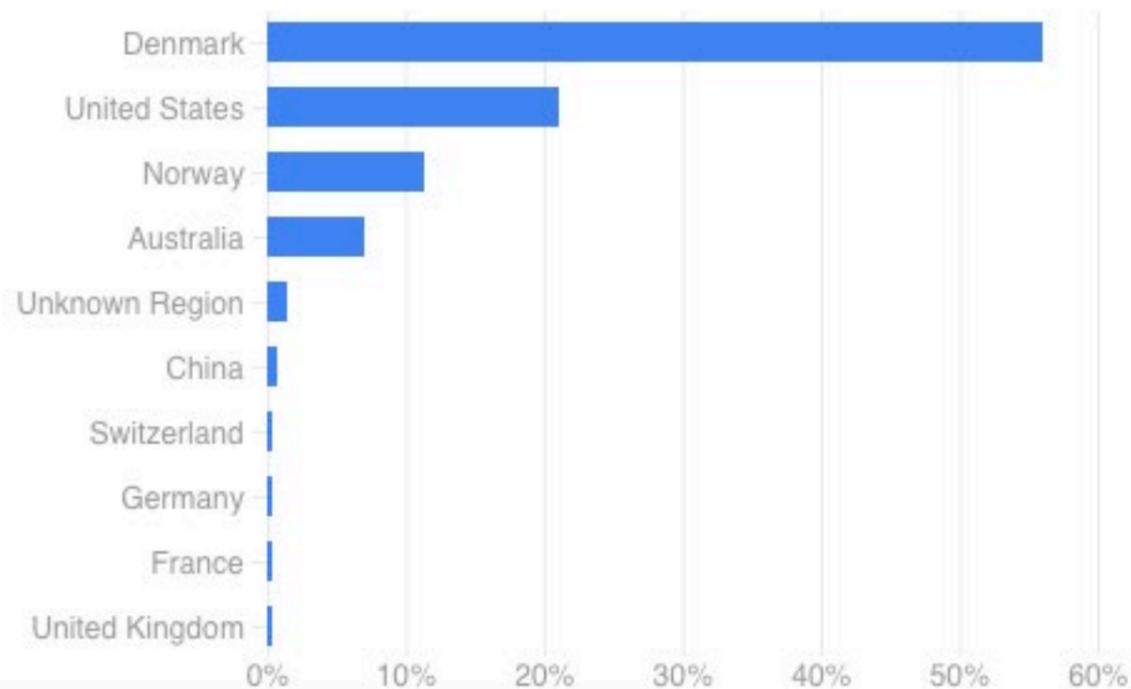


Figure 44: Worldwide overview of RefLevel downloads

BLOCK NAME	DESCRIPTION						
Value Proposition	<p><u>Theory</u>: The second element is Value Proposition Block, which solves a customer problem or satisfies a customer need (Pigneur, 2010, p. 22). Value proposition creates value for a customer through a different mix of elements, in the table below the elements are described, and examples of RefLevel will be presented</p> <table border="1"> <thead> <tr> <th>ELEMENT</th> <th>VALUE CREATION</th> </tr> </thead> <tbody> <tr> <td>Newness</td> <td> <p><u>Theory</u>: New set of needs, which customers were not offered before.</p> <p><u>In use</u>: SportsLevels offers for now only one product, called RefLevel which is a software service through smart watches and made for football referees. RefLevel provides some new features that can help referees before, during and after their game.</p> </td> </tr> <tr> <td>Performance</td> <td> <p><u>Theory</u>: Improving a product or a service, a standard way of creating value for customers.</p> <p><u>In use</u>: The performance of a product is fundamental because it adds value to the customer. At SportsLevels we are innovating to satisfy our customers' needs. RefLevel is creating value by helping referees during a football match. An example is the booking overview. The booking overview allows referees to keep track of the dismissed players. Another important function which the booking overview has is the temporary dismissal time reminder. Denmark was a test market for it, and in 2018 it was approved by UEFA to be used in UEFA countries (modifications to the laws, 2018).</p> </td> </tr> </tbody> </table>	ELEMENT	VALUE CREATION	Newness	<p><u>Theory</u>: New set of needs, which customers were not offered before.</p> <p><u>In use</u>: SportsLevels offers for now only one product, called RefLevel which is a software service through smart watches and made for football referees. RefLevel provides some new features that can help referees before, during and after their game.</p>	Performance	<p><u>Theory</u>: Improving a product or a service, a standard way of creating value for customers.</p> <p><u>In use</u>: The performance of a product is fundamental because it adds value to the customer. At SportsLevels we are innovating to satisfy our customers' needs. RefLevel is creating value by helping referees during a football match. An example is the booking overview. The booking overview allows referees to keep track of the dismissed players. Another important function which the booking overview has is the temporary dismissal time reminder. Denmark was a test market for it, and in 2018 it was approved by UEFA to be used in UEFA countries (modifications to the laws, 2018).</p>
ELEMENT	VALUE CREATION						
Newness	<p><u>Theory</u>: New set of needs, which customers were not offered before.</p> <p><u>In use</u>: SportsLevels offers for now only one product, called RefLevel which is a software service through smart watches and made for football referees. RefLevel provides some new features that can help referees before, during and after their game.</p>						
Performance	<p><u>Theory</u>: Improving a product or a service, a standard way of creating value for customers.</p> <p><u>In use</u>: The performance of a product is fundamental because it adds value to the customer. At SportsLevels we are innovating to satisfy our customers' needs. RefLevel is creating value by helping referees during a football match. An example is the booking overview. The booking overview allows referees to keep track of the dismissed players. Another important function which the booking overview has is the temporary dismissal time reminder. Denmark was a test market for it, and in 2018 it was approved by UEFA to be used in UEFA countries (modifications to the laws, 2018).</p>						



BLOCK NAME	DESCRIPTION	
Value Proposition	ELEMENT	VALUE CREATION
	Customi- zation	<p><u>Theory:</u> Creating a product or a service personalised to customer needs.</p> <p><u>In use:</u> At SportsLevels, we have been looking very deeply into our customers' needs and wants, by creating prototypes and validating these using real-match tests and low-fidelity tests. We are using design sheets to create these user tests, see Appendix I for the template. After each user-test, interview, or match test we sit down and go through the material, and we test to see where we are doing wrong and where are we doing it right, and it is used to create the best experience for our customers.</p>
	Getting the job done	<p><u>Theory:</u> Helping a customer to get a certain job done.</p> <p><u>In use:</u> Getting the job done is very important for football referees. And getting the job done for them is split up into three parts, before, during, and after the match. Before the match, they need to prepare and get ready for the match, during the match each referee has a job to be done by professionally executing the match, and after the match, they have the responsibility of reporting back to their unions and potentially review their performance.</p>

BLOCK NAME	DESCRIPTION	
Value Proposition	ELEMENT	VALUE CREATION
	Design	<p><u>Theory:</u> A product may get more attention because of its superior design.</p> <p><u>In use:</u> In SportsLevels we are working very hard to create a user experience and a design, which is tailored to our customers' needs and wants by using existing design tools such as design worksheets etc. In the chapter "3b: How to implement the lean principles." can be found a more detailed description of how we are using design worksheets.</p>
	Brand/Sta- tus	<p><u>Theory:</u> Simple act of using and displaying a specific design.</p> <p><u>In use:</u> Having a strong brand and status can help us with getting more customers also paying customers. Since SportsLevels is a start-up and is still working on entering the market we cannot argue that we have a strong brand. But, the corporation with the association DBU is the start of creating a strong brand.</p>



BLOCK NAME	DESCRIPTION	
Value Proposition	ELEMENT	VALUE CREATION
	Price	<p><u>Theory</u>: Offer similar values to a lower cost.</p> <p><u>In use</u>: Should the app be free, paid, or freemium (Free to download but has in-app purchases)? What creates the most value for our customer and how do we handle that? Since the start-up of SportsLevels, we discussed the price strategy back and forth. We think an approach which creates most value is the freemium model, where users can use the facilitate (During the match), enable (Performance and statistics) paid, and the automate (before the match) free. At the beginning of the price strategy, we said that data is coming from DBU to the users' smartphones and synchronised to the watch, can be the only thing that referee needs to pay for, but this can also mean that DBU wants to charge SportsLevels because it is their data. As we see it, we have two options:</p> <ol style="list-style-type: none"> 1. The first one is, we charge for the reporting back to DBU, which is paid by the association, 2. or the second option is, we charge the referees for viewing the statistics and performance. <p>We do not know if this is the right strategy, but we will show a couple of scenarios explaining what will happen if we go for one or the other.</p>

BLOCK NAME	DESCRIPTION	
Value Proposition	ELEMENT	VALUE CREATION
	Price	<p>We have created a pricing table, which illustrates the different pricing strategies that we are offering. The pricing table is split up in two different pricing strategies, in the first one, we are creating a subscription model for the referee who knows that during the whole season he/she has matches every week and the subscription model fits them best. The second is clips, which is for the referees who doesn't know how many matches they are going to have during the season and like to be a bit more flexible. We accomplished the two different pricing strategies through the various user tests we have made in this semester. Last, we have the free plan pricing, which is for the referees who do not care about performance or statistics and want to use the watch during their match.</p>



Free & Clips pricing

FREE PLAN	CLIPS PER GAME	CLIPS PER GAME
<p>KR 0 /MO.</p>	<p>KR 29 /5 clips. First 3 clips are for free</p>	<p>KR 99 /20 clips. First 3 clips are for free</p>
<p>Phone: Create Game Edit Game Delete Game View Game Log Synchronize to watch</p> <p>Watch: Start Game Substitution Add Goal Book a Player View game Log</p>	<p>Phone: Create Game Edit Game Delete Game View Game Log View Game Statistics View Game Performance Synchronize to watch Report back to your association</p> <p>Watch: Start Game Substitution Add Goal Book a Player View game Log</p>	<p>Phone: Create Game Edit Game Delete Game View Game Log View Game Statistics View Game Performance Synchronize to watch Report back to your association</p> <p>Watch: Start Game Substitution Add Goal Book a Player View game Log</p>

Figure 45: Free and Clips pricing table

Subscription pricing

PER MONTH PLAN	6 MONTH PLAN	1 YEAR PLAN
<p>KR 39 / month. First month for free</p>	<p>KR 199/ 6 months. First month for free</p>	<p>KR 379 / year. First month for free</p>
<p>Phone: Create Game Edit Game Delete Game View Game Log View Game Statistics View Game Performance Synchronize to watch Report back to your association</p> <p>Watch: Start Game Substitution Add Goal Book a Player View game Log</p>	<p>Phone: Create Game Edit Game Delete Game View Game Log View Game Statistics View Game Performance Synchronize to watch Report back to your association</p> <p>Watch: Start Game Substitution Add Goal Book a Player View game Log</p>	<p>Phone: Create Game Edit Game Delete Game View Game Log View Game Statistics View Game Performance Synchronize to watch Report back to your association</p> <p>Watch: Start Game Substitution Add Goal Book a Player View game Log</p>

Figure 46: Per month pricing table



BLOCK NAME	DESCRIPTION	
Value Proposition	ELEMENT	VALUE CREATION
	Cost Reduction	<p><u>Theory</u>: Helping customers reducing costs.</p> <p><u>In use</u>: Helping our customers reducing costs is significant value creation, but we can argue that it is not always necessary to reduce the price if the service or product still creates value. If we look at the pricing table for grassroots referees in Denmark in Jutland see Appendix I (p. 168), then on average per match, a referee gets 170 KR. If we look at the pricing table from above and compare the pricing per match with the subscription model or the clips, we see that the price per match is high enough to cover the cost.</p>
	Risk Reduction	<p><u>Theory</u>: Reducing the risks which incur when purchasing products or services.</p> <p><u>In use</u>: How can we handle risk reduction on a software service provided through smart wear devices and smartphone devices? According to this article (Seven Ways to Reduce Your Software Development Risk, n.d.), there are seven ways of doing that, agility, minimum viable product (MVP), identify technical risks early, communication, frequently releases and testing, engaging users early and maintainability. Agility is about taking small steps with the project a day to day step.</p>

BLOCK NAME	DESCRIPTION	
Value Proposition	ELEMENT	VALUE CREATION
	Risk Reduction	<p>An agile way of working with RefLevel is fundamental since we do not always know what the outcome of the app should be. The levels in refereeing are very different, and not only between grassroots and elite referees but even from country to country there are different rules. So, every day we need to be agile and taking small steps from day to day. Since we started developing RefLevel, we have tried to follow the rules of MVP, meaning that we create little bits of development giving it to our customers and getting feedback on the progress. Last year we started this with a user from DBU, where he tried the service every time we had something new or when we even made bug fixes to the application RefLevel. Today we are using a tool called Trello to keep a structured way of working with RefLevel, where we focus on creating small changes from release to release. The Figure 47, on the next double page, shows the process we have in the software program called Trello.</p> <p>At SportsLevels we are releasing (or trying at least to release) every week. The reason for this is since RefLevel is in its early stages we still have a lot of improvements and a lot of development to do on the app. So, we decided that it is better to make frequent releases, which includes bug fixes, improvements, and once in a while, we are introducing new features.</p>

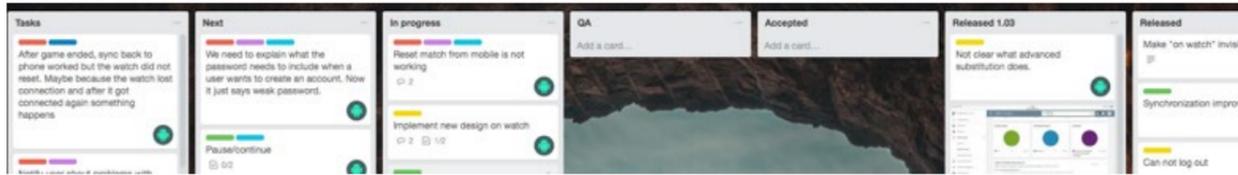
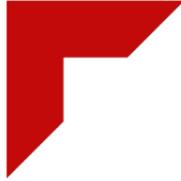


Figure 47: The progress of releasing through Trello

▼ ▶	1.03	Today, 1:26 PM
▼ ▶	1.03	Today, 1:28 AM
▼ ▶	1.03	Yesterday, 4:23 PM
▼ ▶	1.02	Apr 27, 4:44 PM
▼ ▶	1.02	Apr 19, 10:40 AM
▼ ▶	1.02	Apr 18, 3:39 PM
▼ ▶	1.02	Apr 18, 12:20 PM
▼ ▶	1.02	Apr 16, 5:59 PM
▼ ▶	1.02	Apr 16, 5:03 PM
▼ ▶	1.01	Apr 10, 7:11 PM

Figure 48: Google Play releases of RefLevel

WHAT'S NEW

Version 1.03:

- Fixed issue with deleting from previous games.
- Fixed issue when choosing advanced goals on phone, it is now possible to choose between normal, penalty or own goal, and pick a player who scored.
- Fixed crash on round watches when adding a goal.
- Fixed issue with forgotten password.
- Other optimisations and improvements.

Figure 49: Google Play release notes for end-users

BLOCK NAME	DESCRIPTION	
	ELEMENT	VALUE CREATION
Value Proposition	Risk Reduction	Figure 48 on the left page shows RefLevel's releases history. Since 10th of April 2018, we had 11 releases, which included all kinds of improvements and bug fixes. Every time we release we inform the user about changes. Figure 49 shows one of our release notes to the end-users through Google Play Store.

BLOCK NAME	DESCRIPTION	
Value Proposition	ELEMENT	VALUE CREATION
	Accessi- bility	<p><u>Theory:</u> Making products and services available to customers who previously lacked access to them.</p> <p><u>In use:</u> In Jutland Denmark, the referees are split up in four regions as Figure 50 shows (Kontakt din region, 2018). Each region has different board members, which are in charge of the referees. These board members lack information about the yellow card from the refereeing matches every day. They do not have access to information about yellow cards given per year and yellow cards reason. This data is vital for these board members because they need it to evaluate the reason for bookings in different matches. Of course, we do not know the exact reason, the only thing we know is that they need it which Morten Rask told us, and by using RefLevel they will be available to get access to such information. RefLevel collected the recorded data from the different matches and stored on our server called Firebase. As described earlier, Firebase is a backend tool provided Google to save information using either mobile applications or web applications on their cloud server (Firebase, 2018).</p>



Figure 50: Overview of referee regions in Jutland



BLOCK NAME	DESCRIPTION	
Value Proposition	ELEMENT	VALUE CREATION
	Convenience / Usability	<p><u>Theory</u>: Making things more convenient or easier to use.</p> <p><u>In use</u>: We have to acknowledge that smartwatches are not widespread yet, but same as iPhone back when it came out, people were sceptic about it and didn't know if this is going to last, but as we see today the success was overwhelming. We believe when the time for smartwatches comes, people will widely adopt them. See chapter 3a about ExOs.</p>

BLOCK NAME	DESCRIPTION
Channels	<p><u>Theory</u>: The third element is the Channels Block, which describes how a company communicates and reaches its customers (Pigneur, 2010, p. 26). Reaching potential customers can be done through channel types and channel phases. Channel types can be, sales force, web sales, own stores, partner stores, and wholesaler. Channel phases can be, awareness, evaluation, purchase, delivery, and after sales.</p> <p><u>In use</u>: RefLevel is for now trying to reach its customers through social media. But that is the worldwide market, and if we focus only on Denmark and looking at how we are obtaining our customers, then we want to create awareness by partnering with DBU, which can be done either through their DBU football app or sending a newsletter to their referees by using email. Another way is contacting the different football refereeing clubs in Denmark and ask access to their referees, which can be done by existing Facebook groups, email, general meetings, etc. So far, we have access to Aarhus football referees' Facebook group, which has over 300 members. We are working on getting access to the rest of the referees' football clubs if such groups exist.</p>

BLOCK NAME	DESCRIPTION
Customer Relationships	<p>Theory: The fourth element is Customer Relationships Block, which describes the type of relationship a company has with its customers (Pigneur, 2010, p. 28). A relationship between the company and the customer can be described in six different categories (Pigneur, 2010, p. 29). Personal assistance which is based on human interaction is usually done through phone calls, etc. the second category is Dedicated personal assistance which is used to dedicate a specific employee to a particular client. The third category is Self-service which is for customers to help themselves. The fourth category is Automated services which are a more sophisticated type of communication using self-service with Automated Processes. The fifth category is Communities which is an online community to help customers share knowledge between them. The sixth and last category is Co-Creation which engages customers to write reviews to create value for others like Amazon uses it with their book service.</p> <p>In use: Number three, four, five, and six are the goals for Sport-sLevels. Through our website www.reflevel.com and Google Play store, we are offering to help our customers if they have questions or any problems. The Figure 51 shows communication between RefLevel and a customer, who had some thoughts about RefLevel that he wanted to share.</p> <p>Another example is where we got contacted by a customer who had some questions and problems using the app and needed assistance. Figure 52 shows the customers questions.</p> <p>We are also considering contacting our customers by creating a button inside the phone application saying, "Please contact me for updates." The reason for this is that we want to keep a close relationship with our customers, and we don't want to disturb anyone, but instead give the customers the opportunity to be contacted.</p>

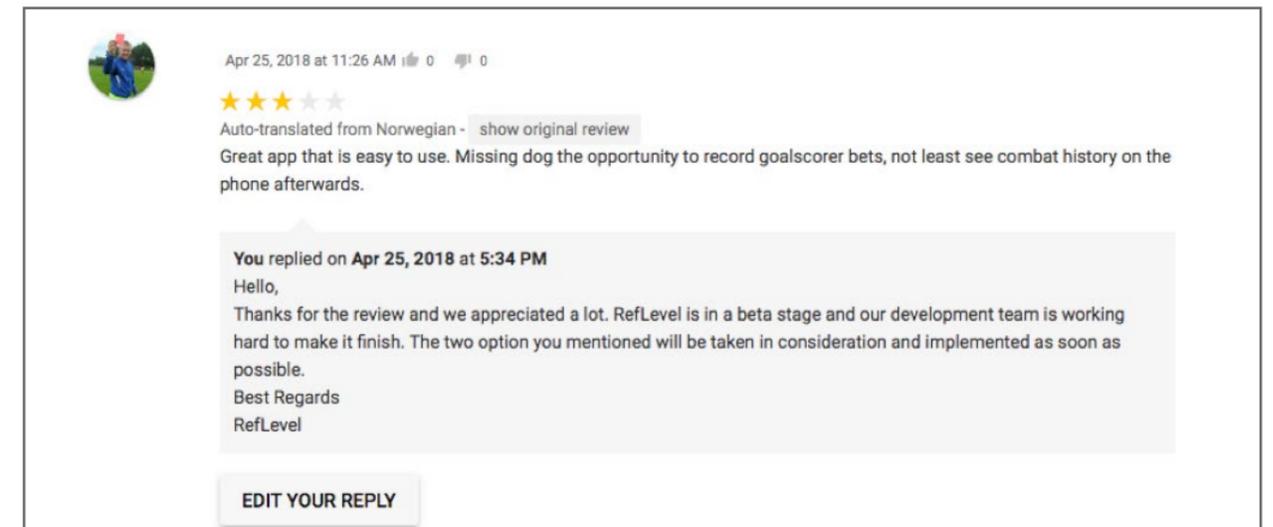


Figure 51: Google Play review

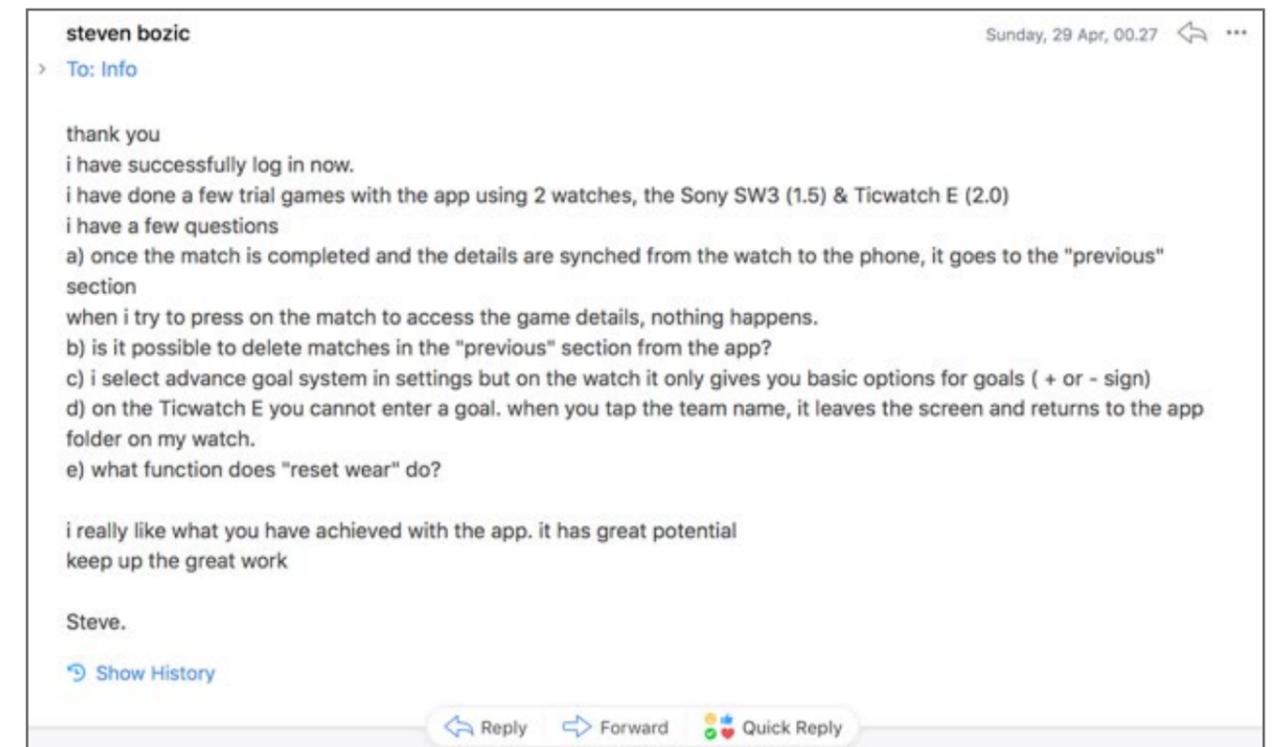


Figure 52: Customer feedback

BLOCK NAME	DESCRIPTION		
Revenue Streams	<p><u>Theory:</u> The fifth element is Revenue Streams Block, which is the amount of money the company generates from its customers (Pigneur, 2010, p. 30). Here it is essential to have information about what the customer is willing to pay, and there are several ways to generate Revenue streams, shown in table 1 (Pigneur, 2010, p. 31-32).</p> <p><u>In use:</u> As mentioned earlier in this chapter, the price strategy will be clips or a subscription due to the different user tests.</p>		
	ASSET SALE	USAGE FEE	SUBSCRIPTION FEES
	Selling physical product to consumer.	The more a service is used the more customer pay.	Selling a continues access to a service, could be monthly or yearly.
	LENDING/RENTING/LEASING	LICENSING	BROKERAGE FEES
Using a particular asset for a fixed price in a certain period in return for a fee.	The access to use a protected intellectual property for amount of fee.	Taking a certain percentage of a value of each sale.	

BLOCK NAME	DESCRIPTION
Revenue Streams	ADVERTISING
	Fees from advertising a particular product, service, or brand.
Key Resources	<p><u>Theory:</u> The sixth element is the Key Resources Block, which creates and offers a Value Proposition, reaches markets, maintains a relationship with customer segments, and earns revenue (Pigneur, 2010, p. 34). Key Resources is defined by four categories (Pigneur, 2010, p. 35) physical, intellectual, human, and financial. Physical includes manufacturing facilities, buildings, vehicles, etc. Intellectual contains copyrights, partnerships, patents, etc. Human resources are crucial in knowledge-intensive and creative industries. Financial includes cash, lines of credit, or a stock option.</p> <p><u>In use:</u> Key resources for RefLevel is split into human resources, partnerships, and financial resources.</p> <ul style="list-style-type: none"> Human resources are developers, designers, web developers, etc. To make RefLevel available for our end-users, we need first of all a designer who can design the application according to the different guidelines provided by Apple (The iOS Design Guidelines, 2017) and Android (Material Design, 2018). When we have the design in place, we need a developer who can implement the different functions and the design. After having all out that, we need to reach out to our users, and we need to show what RefLevel is. For that we have a Web developer who developed the website www.reflevel.com, to explain our users the service



BLOCK NAME	DESCRIPTION
Key Resources	<p>which we are offering and that they can reach us for any questions.</p> <p>A partnership is important because our goal is to make RefLevel automate for referees to give a better user experience. A collaboration with DBU is not only good for user experience but also a necessary step to get the foothold in Denmark and expand to other countries. As we see in the history of SportsLevels, we already got the acceptance, and we need to develop the functionality. Partnerships could also be with other smart wearable manufactures to try and get the wearables cheaper and maybe sell a RefLevel subscription in a bundle.</p> <p>Financial resources are necessary for RefLevel to pay for outsourcing for the development of RefLevel. All design related work has been done in-house together with the web development, but the app development of RefLevel has been a mix of outsourcing and in-house. We are using the Incubator in Aalborg University as our office because we are a part of the start-up program at the incubator.</p>
Key Activities	<p><u>Theory</u>: The seventh element is Key Activities Block, which creates and offers the same as the Key Resources (Pigneur, 2010, p. 36). Key activities can be categorised by 3 activities (Pigneur, 2010, p. 37), production, problem-solving, and platform/network. Production includes designing, making, and delivering a product. Problem-solving includes new solutions to individual customer problems. Platform/Network contains Networks, matchmaking platforms, software, and brands.</p> <p><u>In use</u>: SportsLevels is creating products/service, which involves our end-users. We want to create different solutions for the referees, i.e., shift app for referees to exchange their matches with each other when a referee needs it. Afterwards, we want to create a community platform for referees to share their performance and get help with questions.</p>

BLOCK NAME	DESCRIPTION
Key Partnerships	<p><u>Theory</u>: The eighth element is the Key Partnerships Block, which is about creating alliances to optimise the Business Model, reduce risk, or acquire resources (Pigneur, 2010, p. 38). Key partnerships can be useful to distinguish between three motivations for creating partnerships (Pigneur, 2010, p. 39), optimisation and economic scale, reduction of risk and uncertainties, and acquisition of particular resources and activities. Optimization and economic scale are used to reduce costs and often involve outsourcing or sharing infrastructure. Reduction of risk and uncertainties can be a big help in reducing risks in a competitive environment characterised by uncertainty. Acquisition of particular resources and activities relies on other firms to furnish particular resources or perform certain activities.</p> <p><u>In use</u>: One of our key partnerships is the association DBU, which includes FLU for the grassroots referees, and division union for elite referees, this will be explained in more detail later in the chapter “Who are the main stakeholders of the business value network around RefLevel and how do we connect them to deliver the value proposition?”. Next, we need to look at other countries such as Norway, Sweden, Germany, etc. to get a foothold in these countries through the associations and get access to the API, so we can make RefLevel automate for them as well.</p>

BLOCK NAME	DESCRIPTION
Cost Structure	<p><u>Theory:</u> The ninth element is the Cost Structure Block. It describes the costs incurred while operating under a particular Business Model (Pigneur, 2010, p. 40). Alexander Osterwalder explains that there are two cost structures, the cost-driven and the value driven structure (Pigneur, 2010, p. 41). The cost-driven structure is about minimising the cost in all possible ways, by using low price Value Propositions, maximum automation etc. The second structure is value-driven, which is the opposite of cost-driven. Here a company has fewer concerns about the cost implementations and focuses more on the value creation. The cost structures are defined as following: Fixed costs, variable costs, economies of scale, and economies of scope. Fixed-costs are the costs which stay the same independent of the amount of goods or services delivered. Variable costs are the costs which vary depending on the volume of the service or goods delivered. Economies of scale are the savings which a business enjoys as its scales. Economies of scope are the savings which a business enjoys due to a larger scope of operation.</p> <p><u>In use:</u> Figure 53 on the next page shows the costs of RefLevel for a six-month period starting from August.</p>

Conservative estimation

RefLevel	August	September	October	November	December	Total
Nr. of new customers (DK and abroad)	24	36	54	81	122	317
Income from users per month (subscription)	kr. 936,00	kr. 1.404,00	kr. 2.106,00	kr. 3.159,00	kr. 4.738,50	kr. 12.343,50
Start-up costs						
Office supplies	kr. 300,00	-	-	-	-	kr. 300,00
Hardware	kr. 10.000,00	-	-	-	-	kr. 10.000,00
Domain	kr. 70,00	-	-	-	-	kr. 70,00
Hosting	kr. 300,00	-	-	-	-	kr. 300,00
Legal consultancy	kr. 4.000,00	-	-	-	-	kr. 4.000,00
Marketing	kr. 10.000,00	-	-	-	-	kr. 10.000,00
Other	kr. 10.000,00	-	-	-	-	kr. 10.000,00
Total Start-up costs						kr. 34.670,00
Variable costs						
Office supplies	kr. 200,00	kr. 200,00	kr. 200,00	kr. 200,00	kr. 200,00	kr. 1.000,00
Transportation	-	kr. 5.000,00	kr. 5.000,00	kr. 5.000,00	kr. 5.000,00	kr. 20.000,00
Employees (Part time)	kr. 8.000,00	kr. 8.000,00	kr. 8.000,00	kr. 8.000,00	kr. 8.000,00	kr. 40.000,00
Total Variable costs	kr. 8.200,00	kr. 13.200,00	kr. 13.200,00	kr. 13.200,00	kr. 13.200,00	kr. 61.000,00
Balance	kr. -41.934,00	kr. -11.796,00	kr. -11.094,00	kr. -10.041,00	kr. -8.461,50	kr. -83.326,50

Optimistic estimation

RefLevel	August	September	October	November	December	Total
Nr. of new customers (DK and abroad)	24	48	96	192	384	744
Income from users per month (subscription)	kr. 936,00	kr. 1.872,00	kr. 3.744,00	kr. 7.488,00	kr. 14.976,00	kr. 29.016,00
Start-up costs						
Office supplies	kr. 300,00	-	-	-	-	kr. 300,00
Hardware	kr. 10.000,00	-	-	-	-	kr. 10.000,00
Domain	kr. 70,00	-	-	-	-	kr. 70,00
Hosting	kr. 300,00	-	-	-	-	kr. 300,00
Legal consultancy	kr. 4.000,00	-	-	-	-	kr. 4.000,00
Marketing	kr. 10.000,00	-	-	-	-	kr. 10.000,00
Other	kr. 10.000,00	-	-	-	-	kr. 10.000,00
Total Start-up costs						kr. 34.670,00
Variable costs						
Office supplies	kr. 200,00	kr. 200,00	kr. 200,00	kr. 200,00	kr. 200,00	kr. 1.000,00
Transportation	-	kr. 5.000,00	kr. 5.000,00	kr. 5.000,00	kr. 5.000,00	kr. 20.000,00
Employees (Part time)	kr. 8.000,00	kr. 8.000,00	kr. 8.000,00	kr. 8.000,00	kr. 8.000,00	kr. 40.000,00
Total Variable costs	kr. 8.200,00	kr. 13.200,00	kr. 13.200,00	kr. 13.200,00	kr. 13.200,00	kr. 61.000,00
Balance	kr. -41.934,00	kr. -11.328,00	kr. -9.456,00	kr. -5.712,00	kr. 1.776,00	kr. -66.654,00

Figure 53: RefLevel six-month cost plan

Clayton M. Christensen's Business Model

The identified elements above describe how a Business Model is created through a BMC. This method is called the Alexander Osterwalder BMC. Clayton M. Christensen identifies the elements of a Business

Model in a different way, he explains that it consists of four interlocking elements, which create and deliver value (Christensen C. M., 2015, p. 84)

BLOCK NAME	DESCRIPTION
Customer Value Proposition (CVP)	<p>Theory: The first element and the most important element is Customer Value proposition (CVP), which is to help the customer getting the job done. Christensen explains what it means to get the job done, which is a problem that needs a solution, and only when we understand the job and all its proportions, we can finally design the offering.</p> <p>In use: How does RefLevel help its customers to get the job done? We see it as a journey when a referee uses RefLevel, starting days before the game and lasting days after the game. As mentioned at the beginning of the report RefLevel is a game management tool for football referees in the chapter called "SportsLevels, RefLevel, and Game Management". On the right page Figure 54 illustrates the referee journey using manual input.</p> <p>In the Figure 54, it takes four steps before the referee can synchronise the game to the watch. It is worth mentioning that we assume our competitors also are doing it. We want to improve the process from the image above by making it more automated to make referee's job not only easier but also getting the job done faster. The second image, Figure 55, shows a referee's journey using the automate functionality. Here, the referee skips four manual steps and jumps directly to synchronising the game. At the end of the automate journey we also see that we have the reporting back to DBU, which creates value for the association. Today the associations do not get any data from grassroots referees beside red cards. On the meeting with Morten Rask, he asked for the reporting data from yellow cards as well.</p>

Manual Input

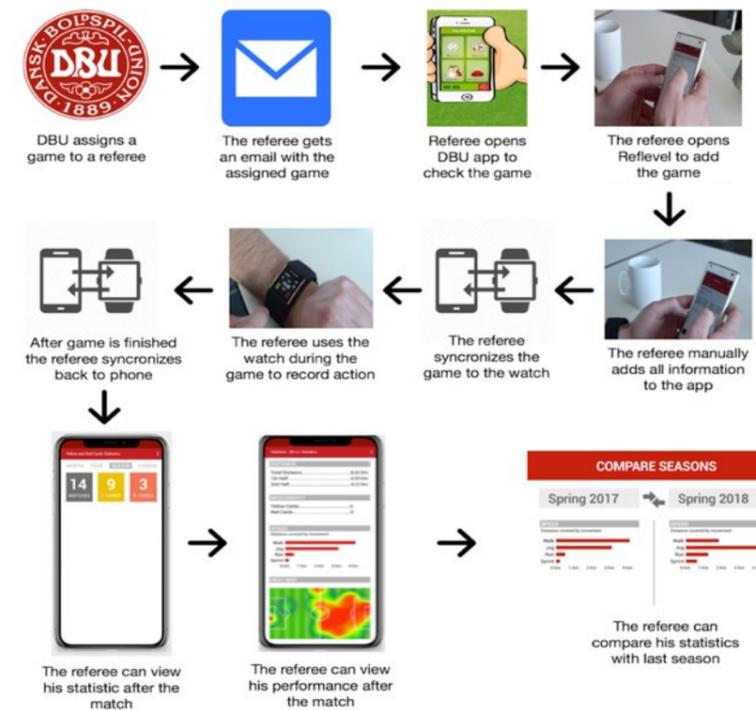


Figure 54: The journey of manual inputting

Auto Input

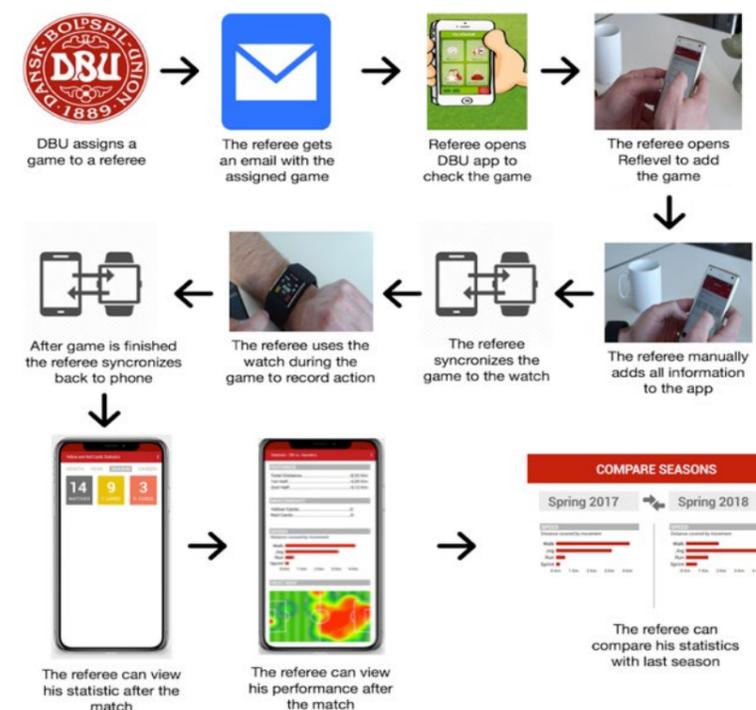


Figure 55: The journey of automate

BLOCK NAME	DESCRIPTION
Customer Value Proposition (CVP)	<p>Besides that, RefLevel is a game management tool, and one can ask the following questions:</p> <ul style="list-style-type: none"> • What is unique about RefLevel? RefLevel is built specifically for a football referee, which gives the referee the necessary functions before, during, and after the game. Also, RefLevel has been validated and tested various times and is tailored according to the referee's needs. The service is not only made by some people who want to start a business, but RefLevel is made especially for football referees. In SportsLevels the CEO Rimon Nassory is a referee and uses the app during his football games. Why is this important? Well, we are not only developing a service which only our customers can use, but we are also developing something that we can use ourselves to see how our customer's journey is. • What do we do better than our competitors? First of all, we are lucky that we are a start-up in Denmark for several reasons. One of the reasons is that we can reach our customers very easily since it is a small country. Second the possibilities of creating a company are very easy here and we can get help from many places. Third, since the country is small, it makes it easier to get to the union and try to agree with them. Furthermore, our functions are not developed just because we think it is nice to have, but it is done because the referees find it useful to have. Another thing we are doing better is the automate part of RefLevel. The automate part is what we have found out to be the most important part of the service.

BLOCK NAME	DESCRIPTION
Customer Value Proposition (CVP)	<p>Automate will make it possible for referees to get the team sheets automatically just a few minutes before the game. This is done by having access to the API (Application programming interface) of the different unions around the world.</p> <ul style="list-style-type: none"> • Who are our competitors? We have different competitors around the world, and some of them offer their service for free plus paid and some of them offer it all for free. But we have two competitors which we see as a real competitor, who is in the market already and have users using their app. Having competitors in the market is both bad and good for RefLevel, good because it shows that there is a market for such a game management service for football referees, and bad because we need to keep up with them to get a foothold in the different countries. In the chapter "External factors and market uncertainties" we will describe in detail who our competitors are and the market size of them. • Why are people excited about RefLevel? The feedback users gave to us is usually very positive. There can be several reasons for this. First, young referees or even older referees who like to use technology instead of pen and paper, find RefLevel interesting and very modern. Morten Rask Rasmussen who is the head of board in DBU Jutland told us that they lose a lot of young referees because they are not always allowed to use new technology. One has to understand that it is essential for DBU to develop young referees to become elite referees and later on FIFA referees. Why is this important? International refereeing is important for referees to develop and it also creates awareness for the different unions around the world.

BLOCK NAME	DESCRIPTION		
Profit Formula	<p><u>Theory</u>: The second element is the Profit Formula, that is, how a company creates value for the company while creating value for the customer. (Christensen C. M., 2015, p. 86) The profit formula consists of:</p>		
	REVENUE MODEL	COST STRUCTURE	MARGIN MODEL
	Price x volume.	Direct cost, indirect cost, economies of scale.	Expected volume and cost structure, contribution needed from each transaction to achieve the desired profits.
	RESOURCE VELOCITY		
How fast we need to turn over inventory, and how to utilize resources.			

BLOCK NAME	DESCRIPTION
Profit Formula	<p><u>In use</u>: When talking about revenue model we raise the question, how much money can be made? This is a question we ask ourselves from day to day. It is not easy to calculate since it can depend on many things, i.e. what do we want to charge for, how many customers do we think we will get, what time of year is it (RefLevel is a seasonal product), who, and how much are we charging.</p> <p>At SportsLevels we believe that the right price for our customers will generate a big number of customers. Meaning if we start with high price, there will always be the possibility of not generating enough customers. Therefore, we argue that starting at a low price to generate customers will be more convenient for us. Also, we have to look at our competitors and what they are offering to their customers for a certain price. If we are at the same level offering the same to a higher price, we might lose potential customers in the future. The cost structure contains direct costs, which can be variable costs. According to the article by Steven Bragg (Bragg, Variable cost, 2018), variable costs are costs that vary in relation to either production volume or services provided. Indirect costs can be fixed costs, which are costs that do not vary in the short term. It is an operating expense of the business that cannot be avoided, such as rent payment etc. (Bragg, Fixed cost, 2017).</p>

4.2 The business value network around RefLevel

Ron Adner explains that, for an innovation to succeed it depends on different partners, the distributor who needs to agree to bring your product to market, the retailer who needs to agree to showcase it, and the salesperson who needs to agree to sell it. Success depends on each of these partners adopting your innovation and seeing the value creating for them (Adner, *The Wide Lens*, 2012, p. 55). In this chapter, we will focus on the main stakeholders around RefLevel, who can help us to deliver the value proposition. In the chapters above, it was mentioned that we had some meetings with DBU, FLI, etc. It was also said that we got the green light for using RefLevel in Denmark by DBU and FLU. Why do we need the green light? Why are DBU and FLU important to RefLevel? How can DBU and FLU help us deliver the value proposition? All this will be answered in the following chapter. If we recall from our BMC, then our value proposition is Facilitate, Enable, and Automate, which is a referee's journey before, during, and after the game, which we define as game management. Referee's journey is in detail described in the following paragraphs:

FACILITATE

In Denmark, referees get assigned a game including the information about a game from DBU. All this information is accessible from DBU's app called "DBU Fodbold App" (Figure 57) under the section about referees called "Min Dommergerning (Figure 58)". Under my games, the referee can click on "Min Kampprogram (Figure 59)", where all the games are listed. Clicking on one of the games (Figure 60) leads the referee to a new screen, where all the information about the game is described (Figure 61). From there it is also possible to view the game rules (Figure 61) and the team

sheets (Figure 62). All this information is saved and owned by DBU and stored on their Database.



Figure 57: DBU app

This information is important for RefLevel because we want to create the best user experience for our end-users and by doing that we need to help the referees before the game. We want to get access to DBU's API, so the referee does not need to create each game manually before the game and add the game information when it is already accessible from DBU's application. We see it as an unnecessary step for our end-users, and it can be very tedious to add 28 players manually.

Access to DBU's API is essential to create a smooth user experience for our end-users. Therefore, a



Figure 58: Referee options overview



Figure 59: Referee games

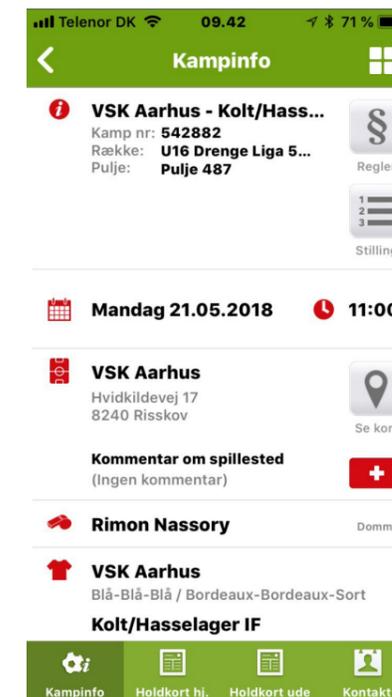


Figure 60: Information about the game



Figure 61: Game rules

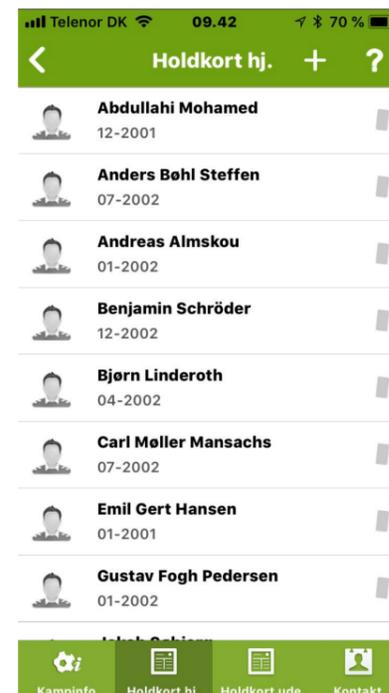


Figure 62: Team sheet

partnership with DBU is essential. Ron Adner explains that “When you rely on partners to enable your success, your success becomes vulnerable to your partners’ progress” (Adner, *The Wide Lens*, 2012, p. 38), Adner explains further that making a corporation also means compromises and delays. We can see this when we started working with RefLevel since it took us more than one year to get the acceptance and access to DBU’s server, which can for sure be defined as a long delay. What about compromises? At the first two meetings with DBU, it sounded like they need to get something in return for giving RefLevel access to their data, which could be money or shares. Today we still have not finished the negotiations, but in the next chapter about Automate, we describe what we could offer DBU and FLU in return for their data.

AUTOMATE

The goal of the Automate value proposition is to remove all manual input for our end-users and create the best user experience. Automate is somehow also connected to Facilitate because it is a part of the end-users journey.

FLU for grassroots referees

As mentioned earlier FLU is in charge for all the grassroots referees in Denmark whereas “Division Union” is in charge of all elite referees, which means that we are creating a partnership with FLU, Division Union, and DBU. We have been looking into what we can offer both of the associations in return for accessing the API. In a meeting with Morten Rask, the head of the board at the FLU committee, he told us that they lacked information about their grassroots referees and suggested that we could offer information about yellow cards from games played in Denmark. Providing a new way of refereeing by using modern technology such as smartwatches instead of pen and paper is already valuable to FLU because Morten Rask mentioned young referees stop refereeing because they are not allowed to use technology during

football games. To sum it up, we are offering the FLU statistics and a modern game management tool for grassroots referees.

Division Union for elite referees

RefLevel can overtake the task of manual input from referee and football coaches and make input automatic. Using RefLevel, we stored data recorded during the football match in our database. Football coaches report back to DBU about the match result, and grassroots report back if any red cards were given during a game. Using RefLevel, we can remove the manual input and make it simpler. The referee needs to go through DBU’s application to report the red card, the same step for match result.

We can offer DBU to automatically send the result back to them if any red card is given. It is not necessary to open their app and remember who got red card. Before the green light from DBU, we had our concerns if DBU could turn us down. So, we came up with an idea what to do if we did

not get the green light, which was Optical Character Recognition (OCR). The goal with OCR was that referees could go to the DBU app and take screenshots of the team name, go to the RefLevel app and our OCR could run through the team sheets without the end-user needed to do it manually. One of the meetings with DBU, they told us that they have a lawsuit against a company

Figure 63: DBU’s red card reporting

called Tensor. Tensor uses a data scraper because they couldn’t get an agreement with DBU to get information about football players, and therefore a law suit is now in progress between DBU and Tensor. Of course we try to avoid a lawsuit with DBU. Let’s look into performance and statistics and see what we can offer DBU, Division Union, and FLU.

ENABLE

Referees performance and match statistics are what we call enable, and this is what the referee goes through after the game during their journey. Performance improvement is somehow a need for some referees and for others it is important, that depends on the referee’s goals. Statistics is a nice to have, something we can offer for the referee who is interested in checking and comparing statistics from game to game. But the enable is more than just for the referee, enable addresses Division Union, FLU, DBU, referee developers, etc. Everyone is interested in getting some more information about how the game went, and the data is especially interesting for DBU, Division Union, and FLU. As mentioned earlier DBU uses football coaches to report back the final score of a grassroots game, and referees need to report back the red card to DBU with some information. FLU is interested in getting info’s about their referees booking for evaluating what’s going on. The enable value proposition stores this information into our database.

Looking at our value proposition facilitate, automate, and enable to deliver the value to our end-users it is not enough to create an application service, which can fulfill the referee’s needs. A partnership with FLU, Division Union, and DBU is essential for RefLevel’s future to succeed and not fail. Using DBU, Division Union, and FLU creates significant opportunities for RefLevel to reach our end-users through their referee meeting, DBU’s newsletter program, etc. Defining RefLevel’s stakeholders and how we use

these stakeholders to deliver the value proposition can be seen as the value network around RefLevel, which is illustrated as a value blueprint in the Figure 64 below.

The Value blueprint lays out the elements that

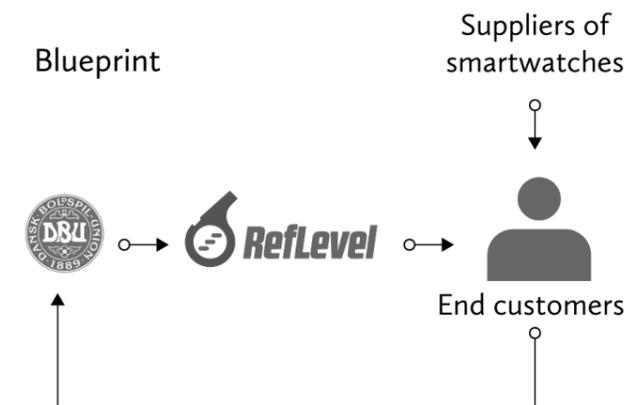


Figure 64: Blueprint

are required to deliver the value proposition, the elements show how the activities are positioned, how they are linked, and what the actor is responsible for (Adner, *The Wide Lens*, 2012, p. 84). In next chapter, we will describe how the Customer Segment Block, Channels Block, and the Customer Relation Block can help us identify external factors and market uncertainties.

4.3 External factors and market uncertainties

In this chapter we will address the external factors such as who are RefLevel's competitors and what are their strategies. Thereafter, we are going to look at the market for football game management and identify which market is the next market to go for RefLevel.

MARKET RESEARCH

When RefLevel gets a foothold in Denmark, we can use this as an opportunity to explore other opportunities in other countries. From one of our user-tests referee Michael Wachowiak, who is 57 years old, am bassador in DBU Jutland, chairman for the referee football club Djursland, and referee developer in Jutland, told us that we have some opportunities in other countries. Besides refereeing in Denmark, he has refereeing license in Germany and Norway, where he has been refereeing for more than 20 years. He explained that in Germany and Norway they have the same system as in Denmark, where referees can use an application to view their refereeing games, and use the same app to report back, and could see that our application could work the same way in Germany and Norway. Furthermore, Michael Wachowiak explained that in Germany it could be a bit difficult to get in, because they are a bit more detained regarding new technologies where in Norway the technologies are more upcoming and people more open to new technology changes. The view on the two markets from Michael Wachowiak made us think about two uncertainties, first, which market should we target after Denmark, and second, where will it be easier to enter. As it was already mentioned above in previous sections, RefLevel is a game management tool, which creates value for football referees by facilitating, automating, and enabling and it also creates value for associations

by offering data about their referees. Furthermore, RefLevel is an application which is available to use by everyone for free during football games because we are offering some functionalities without payment. Later, during the market research, we will go through the functionalities which RefLevel offers for free, and which ones are paid. Since RefLevel's value proposition includes associations and football referees, the group has considered both sides in the market research.

FIFA, Confederations, and Associations

To get a better overview of the football market, a desk research has been conducted to discover the different associations around the world. The Fédération Internationale de Football Association (FIFA) is founded in 1904 and based in Zurich. FIFA has 211-member associations (About FIFA, 2018, 05 20). FIFA includes six confederations, UEFA (Europe), CAF (Africa), CONCACAF (North and central America), CONMEBOL (South America), OFC (Oceania), and AFC (Asia) (Associations, 2018). On the next page, Figure 65 shows the different confederations and the number under each confederation represents how many association members there are.

UEFA

Figure 65, shows that Europe is the biggest federation in FIFA with 55 countries including Denmark, which is the market RefLevel is trying to get foothold in. Denmark is of course a niche market with its 3744 football referees, if we look at other countries such as Germany, France, Spain, England, etc. the number of referees may be higher than Denmark. We have done a Desk research, and phone calls to the different associations to get the number of referees, the research was made by selecting random countries which is part of UEFA.

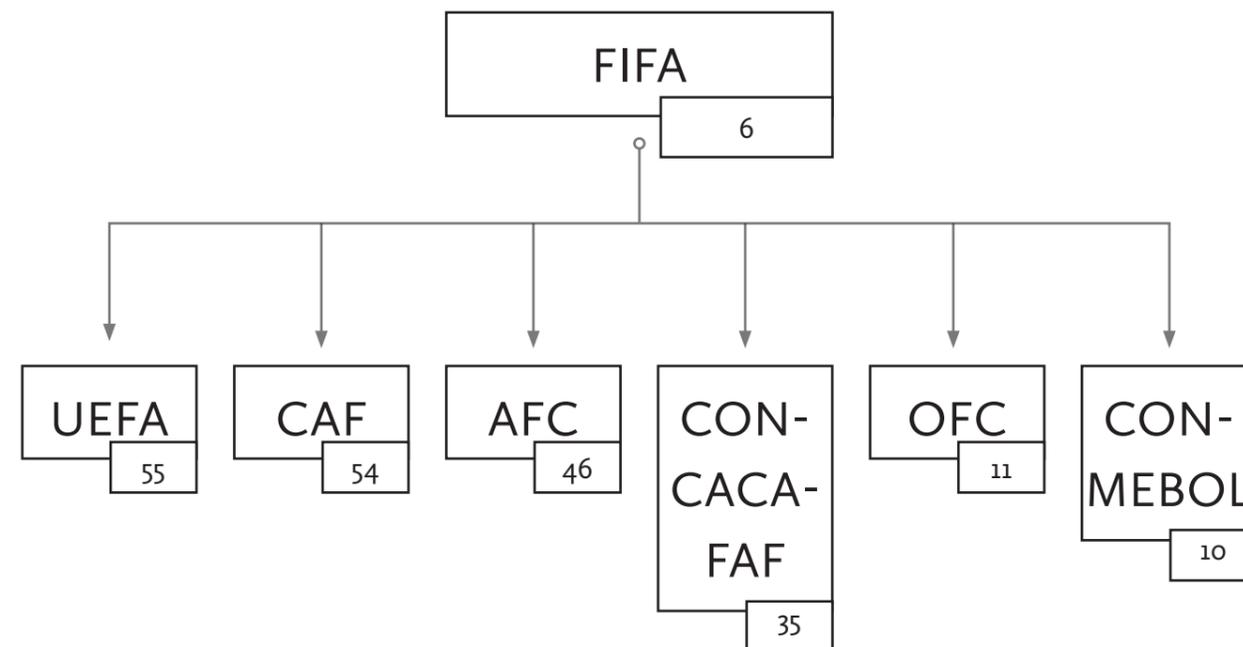


Figure 65: Structure of Football Game Management



Figure 66: Numbers of referees in other European countries

Through a desk research we found the number of referees for the countries Denmark, Germany, and England. Furthermore, we found the numbers of games played in some of the above mentioned countries. The Spanish and Swedish associations were called but they did not know the number and we could not get in contact with the English association. For Denmark it was easy because Rimon Nassory, who is a referee, has access to www.dbunet.dk, which is a backend platform for Danish football referees. There it is possible to see all football referees in Denmark and get the number of referees as well. For Germany a desk research was made (Ohne unparteiische geht es nicht, 2018), same for England (SSN/FA study: Lack of respect for referees at elite level has trickle-down effect on grassroots, u.d.). For Spain it was not possible to get the total number of referees through a desk research, we made a research on their website www.rfef.es without any luck, then we contacted a Spanish girl from our class Alejandra García, who called the associations and asked for the total number of referees. The rest of the countries were either contacted by phone or by email. Looking at the numbers of referees in the different countries, we clearly see that Germany is the country with the most referees and Denmark has the lowest number of referees. Based on our positive feedback from Danish referees, advantage of a small Danish market, and having access to all Danish football rules, we assume that it was a wise decision to use Denmark as testing market and proof of concept. Since the beginning of SportsLevels, we have had easy access to referees, DBU, FA, etc. We do not know if had been better to start in a bigger country. We assume that a small country is very good as a test country and getting the green light from DBU in a niche market can help SportsLevels move upmarket and explore more countries. From the Figure 66, based on market size we can conclude that the next market to enter should be Germany. However, there might be better opportunities for RefLevel to succeed. We argue that our next target market should be a market where innovation is high, where the country is using the new technologies, and is not afraid

of new innovations. The European Innovation Scoreboard (European Innovation Scoreboard, u.d.) shows the innovation strengths between 15 countries. The green colour from the Figure 67 shows the innovation leaders, which are mostly nordic countries, Germany and UK. Figure 68 shows which countries are the innovation leaders. Sweden, Denmark, Finland, the Netherlands, etc. are the top leaders. Denmark in top two proves that starting in a small country does not have to be a disadvantage; we can also see Denmark is awarded with the most innovation friendly environment. Furthermore, getting a foothold in a country like Denmark can help us to move to the next country.

According to the two figures on the next page (Figure 67 & Figure 68), we can conclude that our next market will be Sweden. We also see that Germany with its 75.000 referees is actually in top six as an innovative leader. At the beginning of this chapter we mentioned the user test with Michael Wachowiak and that in his opinion Norway is easier to enter because Germany is more detained with new innovations. But in European countries, Germany is among the top six countries, Norway is not an EU member which means that it is not included in the figures.

Does this mean that we will not consider Norway? According to the European Innovation Scoreboard 2017, Norway is a strong innovator and their performance has increased by 14,7% since 2010 (European Innovation Scoreboard 2017, 2017, p. 72). There is more than one country we could enter, and the choice is up to SportsLevels and figure out which country to target next. Since almost no product is without competitors, the next chapter is about RefLevel's competitors.

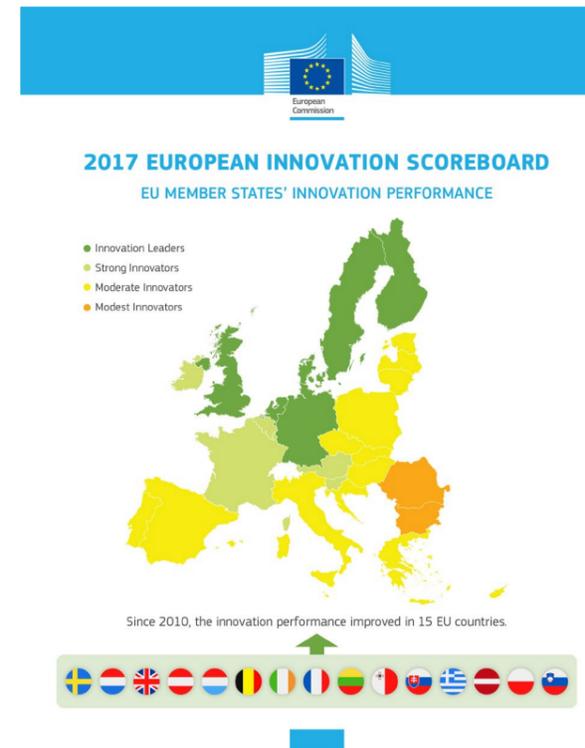


Figure 67: European innovation scoreboard from 2017

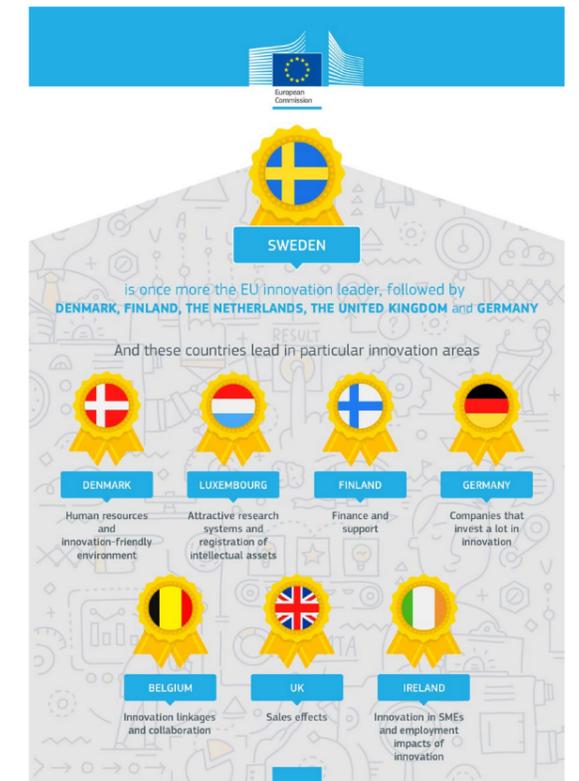


Figure 68: EU innovation leaders

COMPETITOR ANALYSIS

In the competitor analysis we will identify our competitors and evaluate their strategies to determine their strengths and weaknesses and compare it to RefLevel. RefLevel's value proposition includes a referee journey before, during, and after a game and we want to identify the competitors who maybe have the same value proposition, to determine what their strategies are and how we can create competitive advantages.

Identifying Competitors

The following competitors were identified through a desk research using the word "Smartwatch app for football referees", RefSix, RefLive, RefCard, and GoRef. The competitors have been placed on the world map as shown in the figure below (Figure 69) to illustrate where the competitors are placed around the world. These four competitors are identified because they all offer an application through a smartwatch for football referees.



Figure 69: Overview of RefLevel's competitors

If we look at Europe we see that two of our competitors RefSix (England) and RefCard (France) are close to the markets which RefLevel wants to enter. That means that competition in the European market makes it difficult to get into new markets, but on the other hand RefCard which will be shown later in this chapter does not have an app on Android or iOS, which leaves RefSix as the only competitor in Europe.

RefSix entered the market in 2016 June (Refsix is the first smartwatch just for football referees, u.d.) which is two years ago, and has more than one thousand installs on their Android app (REFSIX - Soccer Referee Watch App, 2018). In Australia the other two RefLive and GoRef companies are placed, which is very far away from Europe, but it does not mean that they cannot enter the European market. GoRef is only available on iOS and through the Apple app store. Therefore, it is not possible to see how many downloads they have. But, a very important thing is that their last update for the application is July 2016, which could indicate that they are not working anymore on

their application (GOREF – Football Referee App for Apple Watch, 2018). This means that the only competitor we have outside Europe is RefLive, which is updating their application constantly as we see on their version history on Android and iOS from the app stores, RefLive is available on Android and iOS same as RefSix (Football Referee App - RefLIVE, 2018). The figure below shows the different front screen of the different applications offered from our competitors and RefLevel.

The main information from the different screens are:

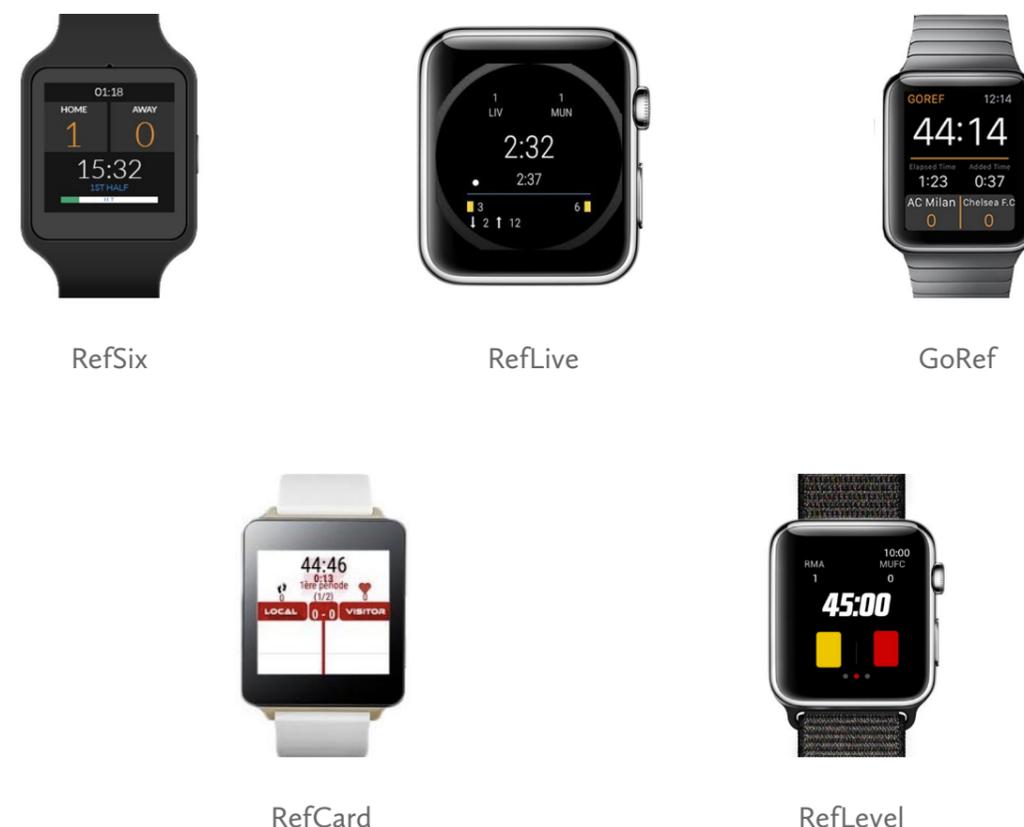


Figure 70: Referee app designs of the main screen

- Game time overview
- Extra time overview
- Score overview
- Team Names (RefCard does not offer that, it is pre-set to visitors and local)
- Half time indicator (Only RefSix and RefCard)
- Access to red and yellow card (Only RefLevel)

Assessing Competitors

Next, we analyse what competitors are offering the end-users and compare it to RefLevel to get an overview of the different feature and competitors

strategy. The table on the next page (Figure 71) shows the different features and where the app is available. The features were found by making a desk research using googles search engine,

searching for the different functionalities that our competitors are using, we also used our competitor's website to go through the different features.

COMPANIES/FEATURES	RefSix	RefLive	GoRef	RefCard	RefLevel
Game time Management	x	x	x	x	x
Goal Management	x	x	x	x	x
Booking Management	x	x	x	x	
Substitution Management	x	x	x	x	x
Extra Time Counter	x	x	x	x	x
Game Log Mobile	x	x	x	-	x
Game Log Watch	x	-	-	-	x
Statistics Overview Mobile	x	-	-	-	-
Performance Overview	x	-	-	-	-
Extra Time and Penalties	x	-	x	-	-
Automate Management (Integration with Associations)	-	-	-	-	x
Available on iOS	x	x	x	-	-
Available on Android	x	x	-	-	x
Booking Overview	-	-	-	-	x
Booking Dismissal Management	-	-	-	-	x
Live score for fans	-	x	-	-	-

Figure 71: Competitor feature comparison

Let's exclude the two competitors GoRef and RefCard, because one of them are not live with an application on the stores and the other has not updated their application since 2016. RefSix past strategy was a demo version of their application allowing end-users to test their application. Then they introduced a full working but a paid version as it is today, and it costs 5€ per month or 50€ per year. RefLive's past strategy was free app to download and they had in-app purchases, but for some reason at one point, they created a new version of their application and told the users that they can use their app totally free, and no more in-app purchases.

Pricing strategy

RefLevel is still in its Beta stage of development and therefore the app is free of charge. The table below (Figure 72) shows the different price strategies, where RefSix is the only one who charges money for using the app. It is free to use RefSix but accessing the statistics and performance overview a small fee is needed. GoRef, RefCard, and RefLive are not charging anything. As it is for now, RefLevel is free to download and use, one of our

plans for the revenue stream is to make reporting data back to DBU as a paid feature.

Considering the pricing strategy, features table, etc. RefLevel has two main competitors who are launched before RefLevel and are some steps further in the development stage. From the google play numbers, we also see that they have more downloads than RefLevel. We believe that RefLevel can get in front of our competitors and beat our competitors by focusing on the automated part for referees, so they do not need to do manual inputting before the game and connect referees to their associations.

SportsLevels Game Management in a bigger picture

Until now we have been talking about how to get a foothold in the Danish market and how we can cooperate with the association DBU to deliver the value proposition for our end-users. Furthermore, we have been talking about which market we should enter to get a foothold for RefLevel. We will explore possible opportunities for SportsLevels in future. We will look at different sports

COMPANIES/PRICING STRATEGY	REFSIX	REFLIVE	GOREF	REFCARD	REFLEVEL
FREE	-	x	x	x	x
FREEMIUM	x	-	-	-	-
SUBSCRIPTION	x	-	-	-	-
CLIPS	-	-	-	-	-
IN APP PURCHASE	x	-	-	-	-

Figure 72: Competitors sale strategy comparison

markets besides football and evaluate why they would or would not be suitable for SportsLevels to enter.

Entering a new sports industry

Desk research has been conducted to find out how big the sports industry is. According to the article, how big is the sports industry from 2017, (How big is the sports industry?, 2017) football industry with 43% (Figure 73) share of the global financial sports market is number one in the world. It is the biggest sport followed by American Football with 13%, and Baseball with 12%. The rest of the sports and their percentage are shown in the table below:

SPORTS INDUSTRY	SHARE
FOOTBALL	43%
AMER. FOOTBALL	13%
BASEBALL	12%
FORMULA 1	7%
BASKETBALL	6%
HOCKEY	4%
TENNIS	4%

Figure 73: Share of the Global Market

The football industry is already entered with RefLevel, and as a test market was chosen in Denmark due to several reasons. We live here, understand the language and Denmark is generally open to innovation and technological improvements. According to the table, the next option could be American football with its 13% of market share.

In USA football as we know it in Europe is called soccer. Therefore, American football is a different kind of sport from football. This option allows us to enter a different market with SportsLevels, but the primary users will again be referees. However, we are aware of that rules for American football are different, and that would require entirely new prototyping process, learning the rules and for a while maybe even moving to the USA. Even though the American football is the second biggest sports market, it might be more practical to focus on a sport which we are closer to at least for a moment. On the other hand, if we look at it from market size assessment, it would make sense for SportsLevels to enter this market. We are

exploring opportunities, and this is one of them.

An interesting market for SportsLevels if we stay in the football market could be the fans. By that, we mean the fans who love football and love to follow their favourite team from youth to professional. We could use RefLevel to share the live

data with fans who are interested in not losing any moment from the game but instead get active notifications while watching or just leaving to get some beers for the game. The fans market is a market that needs to be explored because there could be an interest from football coaches and other staff who is very much interested in their games and takes notes of everything that happens during the game. The fans market needs to be explored in the future.

Sharing the data

If we look back to RefLevel, another market that we could explore is the betting market. In the future, having many users using RefLevel application and collecting data from the different matches around the world, will create a very important set of data that could be used by the betting companies to predict the outcome of the different matches. The good thing here is that SportsLevels does not need to spend money on development, the data is already collected by RefLevel and can be shared to the different betting companies, which would pay us money to get the data. We also do not know if we can run into a lot of political problems regarding sharing the data from the referees, but this is something that SportsLevels could investigate and explore more in the future and get a better understanding how betting companies exactly operate and if we can create value for them.

Scouting young talents

Elite referees today, they are equipped with all kind of sensors and performance measurement, which is used to evaluate referee's performance and help the referee to perform better. In grassroots case it is a bit different, referees are measured by observing only 1-3 times per year, and do not have any tool to help them to improve their performance. Using RefLevel's performance and statistics for the individual referee, we can offer the associations to keep track of their young referees even if their referee developers are not at the field. We can open new opportunities for football associations to develop and scout young and talented referees by using RefLevel's data.

Considering the above mentioned market possibilities, we assume that SportsLevels has big potential in the future to enter any market that has something to do with sports. We assume the best opportunity for SportsLevels is to enter a new sports market, i.e. American Football. At the same time, we also have the opportunity of helping the associations by providing them performance improvements data about their referees. The betting market is a huge market for betting people, who like to play on different games, we believe that SportsLevels has a significant potential here to get into a market where it lives out of the data coming in and giving again to the betting players.

5 SUMMARY & BIBLIOGRAPHY



5.1 Summary

This master thesis consists of four chapters. Chapter 1 started by introducing the reader to SportsLevels' history. It was explained how the idea of RefLevel, a smart-watch based software service for referees came to life, how both the SportsLevels team and the RefLevel user interface have changed over time, and how the first contact with referees and the DBU was organized. Next, we analysed the user journey a referee goes through, starting days before the game and lasting until after the game when all results are reported to the association. Based on this journey, we defined Game Management for football refereeing as all control activities a referee has to execute along this journey. Finally, engaged scholarship was explained from which the research and publication design of this master thesis derived. A key aspect of chapter 1 was raising the research question of this master thesis:

How to organize SportsLevels and create a sustainable Business Model for RefLevel in order to establish a customer base as a fundament to benefit from the exponential price performance development of wearable disruptive technologies?

And how to develop a Business Model for the niche market of Game Management for football refereeing and how to get on an exponential market trajectory towards a mainstream market position in football Game Management?

Chapter 2 answered the research question at a theoretical level and was broken down into two subchapters. The first subchapter clarified the organizational structure of football in Denmark, elucidated DBU's IT system with its different modules, and showed how these modules together make up a complete football game management solution, but that the part referring to referees is missing so far. Finally, it was shown what infor-

mation is needed or generated before, during, and after a football match.

The second subchapter dealt with Disruption. To counteract the trend that Disruption is sometimes equated with the theory of Clayton M. Christensen, the main actors in the intellectual history of Disruption were first identified. Afterwards, and according to Joshua Gan's categorization, the three main theories of disruption, demand-side disruption by Clayton M. Christensen, supply-side disruption by Rebecca Henderson and Kim Clark, as well as the replacement effect by Kenneth Arrow were presented. Finally, it has been noted that these theories do not specifically consider the speed by which an innovation establishes. However, this is a relevant topic especially with regard to digitization (the software service RefLevel is a replacement for pen & paper) and hence represented the transition to chapter 3.

In chapter 3 the topic of the speed by which an innovation establishes, and a start-up company grows was taken up and framed by two different concepts. The first subchapter covered the concept of the "Lean Start-up" movement, which deals with the internal organization of work processes in a start-up company. The Lean Start-up concept was broken down into its individual parts and for each part the practical implementation in SportsLevels was described.

The second subchapter dealt with the concept of exponential organizations. An exponential organization can be determined by 10 characteristics, which are all related to digitization and are the basis for companies to get on an exponential market trajectory. Similar to the subchapter before, the individual characteristics were first described and then the practical implementation in SportsLevels was shown.

Chapter 4 was built upon the learnings from the past semesters about Business Model Canvas, creating customer value, etc. The focus of this part was to generate a business model by using either

Alexander Osterwalder's Business Model or Clayton M. Christensen's Business Model. We ended up with choosing Osterwalder's Business Model because it was more suitable for the way RefLevel is organised. Inspired by the Business Model Generation book, we looked deeper into different blocks from the Business Model Canvas. We evaluated the Customer Relationship Block to get an overview of our customers and stakeholders, and how they are connected and helping RefLevel to deliver the value proposition to our end-users. Furthermore, we looked at the Customer Segment Block together with the Partnerships Block to define the market size for football game management. We created an overview of markets RefLevel could enter. Sweden, Norway, and Germany were found as possible candidates due to the size of the market. Germany has the biggest market, Norway offers technological improvements, and Sweden is the innovation leader in Europe.

We then looked at RefLevel's competitors and evaluated each of them and found that RefLevel's main competitors are RefSix and RefLive. We looked at the pricing strategy to determine what they are charging. Next, we examined SportsLevels in a bigger picture and evaluated the sports industry market to give a better overview of the market potential for SportsLevels. We found out that SportsLevels has significant potential in the betting market, because we can sell data to betting companies so they can predict the outcome of football matches. Scouting young talents and helping fans with live data are additional possibilities for SportsLevels.

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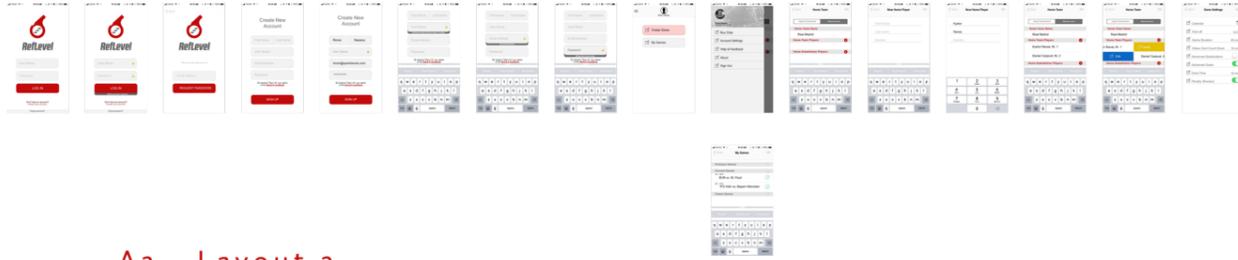
6 APPENDIX



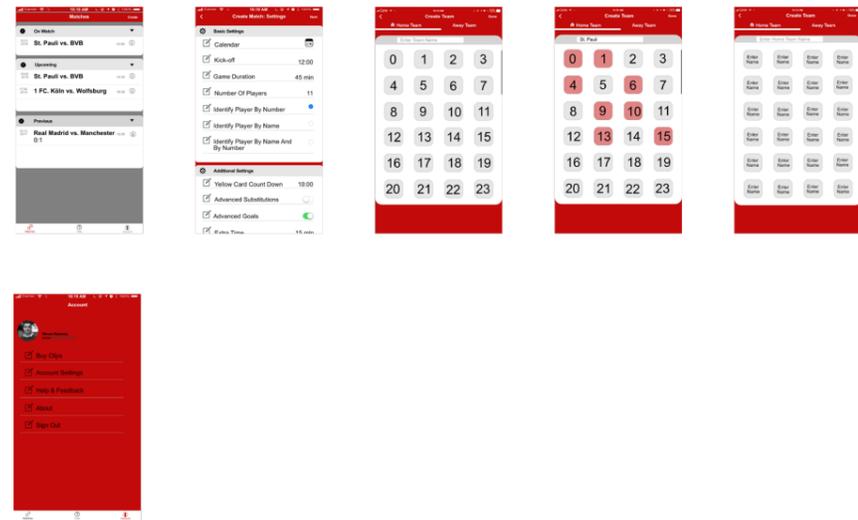
6.1 Appendixes

A - MOBILE INTERFACES DESIGN

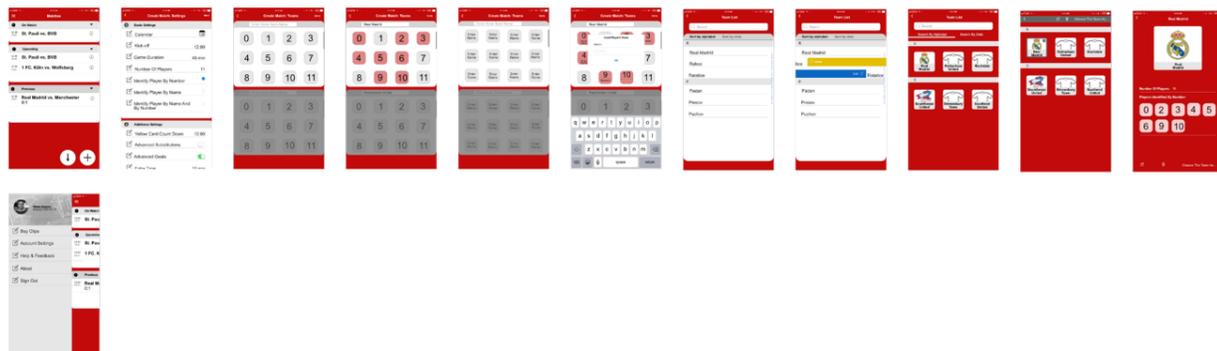
A1 - layout 1



A2 - Layout 2



A3 - Layout 3



B - USER TESTS OF REFLEVEL ON MOTO 360 SMARTWATCH AND MOCK-UPS FOR IPHONE

Activity: User tests of RefLevel on Moto 360 smartwatch and mock-ups for Iphone

Worksheet no.:	1	Date:	23/1	Responsible:	Monika / Sebastian	Deadline:	6/2
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Objective:

RefLevel on smart watch

The intention is to test the understandability, navigation and user friendliness of RefLevel on the smartwatch Moto 360.

The plan is to use the current user interface (UI) and test it with the focus group in Aarhus.

The testing method is a thinking aloud test and a structured questionnaire.

The desired result is to see if a referee can navigate through RefLevel without our interruption, complete few tasks and understand it.

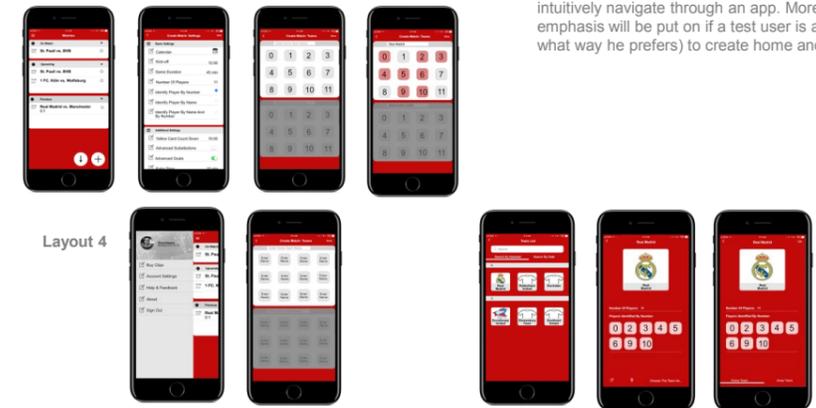
Phone app

The intention is to create a phone app which is easy to understand. The focus is to test the app's functionality rather than design elements at this point.

The plan is to develop several layouts suggesting handful ways how to navigate through an app and discuss them with the focus group in Aarhus.

The testing method is to suggest two different low fidelity phone mock-ups with the referees and make a video recording of the whole session.

The desired result is a test user should be able to intuitively navigate through an app. Moreover, the emphasis will be put on if a test user is able (and in what way he prefers) to create home and away team.



Layout 4



Layout 5

C - INTERVIEW WITH MORTEN LUND

Activity: Designing UI inspired by Apple watch

Worksheet no: 2	Date: 27/2-2018	Responsible: Monika	Deadline: 12/3-2018
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Objective:

Here you briefly state the intention, plan, method and desired result for the activity

Intention: Create intuitive layouts inspired by Apple watch interfaces

Plan: Read about Apple's Human Interface Guidelines, Come up with an intuitive design, Test it with a person who has a knowledge about apps

Method: For the intuitive design I will use hand drawn images, and convert them into Photoshop drawings. For the tests I plan to set up meetings record them and listen to feedback which will be turned into subsequent design for Apple watch.

Desired result: Intuitive, reliable, situation tailored app

Experiment/data:

Apple watch mock-ups can be found in: SynologyDrive->Design->03_Front_Ends->01_Watch_Front_End->watchOS_42mm->07_Screens_42mm

Interview with Morten (PHD in user movement)

- When resetting the app you want confirmation prompt
- Strive for using the same structure both on IOS and Android, so the mental model you are supporting is the same independently of the technical platform
- The gestures you use for the with various actions should be very well connected with physicality of the system
- **Important to consider the situation the judge is in when using features** (small display, stressful situation, interacting with a player, 2 teams, audience)
- **You don't have to think about how to operate the system**
- **Or don't feel like you don't have an overview**
- **Don't present too much information on the display at once (What is the most important information right now in the situation? What is the context?)**
- Having the Yellow and Red cards up, is it really important as standard information or is it something else that would be more important to have access to? Or should they appear only in eventuality cards being given?
- The design right now is showing the original purpose of the app, in which you later on add features.
- Maybe have an access to the football regulations.
- The events (game) log might be more important than card log to swipe into.
- **Prioritize features (screens)!!!**
- Book: David Benyon – PACT (peoples (who is it?), activities, context (which context), and technology + information that is meaningful)
- Book: Designing for gestural interfaces
- On the screen where you add, subtract goal write who you add the goal to

D - NOTES FROM USER TEST WITH PETER ERIKSEN

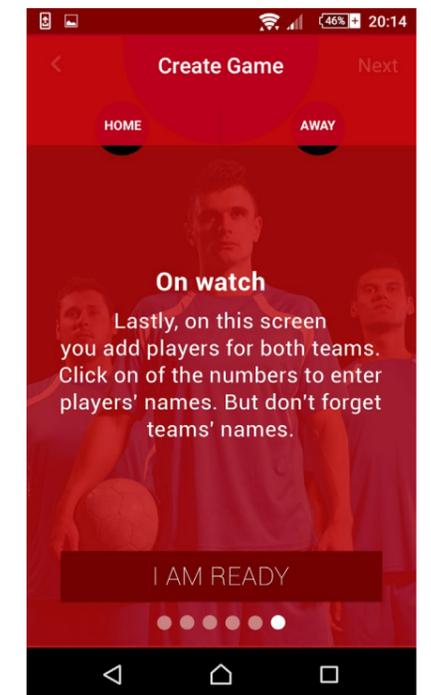
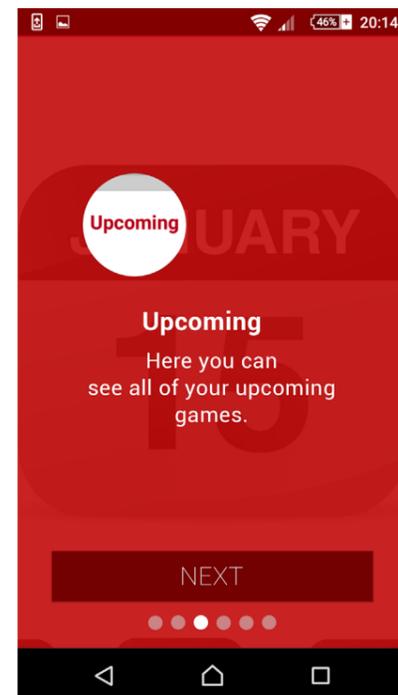
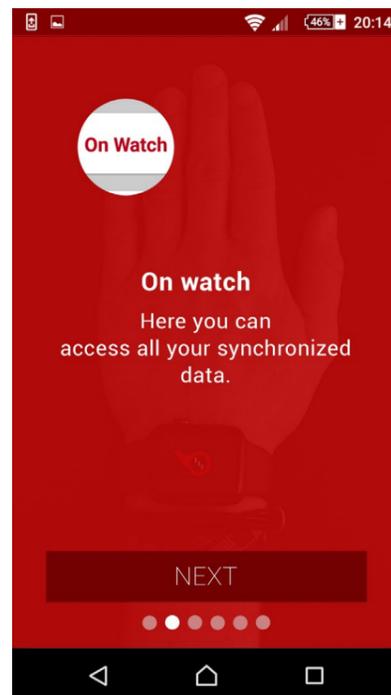
Notes from videos of the usertest with Peter Vestergaard Eriksen, 2018_04_07

DSCF2651

Peter is tasked with creating a game and syncing it with the watch to learn where the app is not working or where something needs to be changed.

- 2:00 Advanced substitutions are not clear
- 2:20 Peter asks whether the time is pr. half game. Maybe add in the app, that this is not the time for the whole game (note has been made in Trello)
- 2:30 Advanced goals are not clear. In the worksheet it is written that "advanced goals seem to be clear", yet in the video, Peter goes back, and someone explains him what advanced goals means and after this, Peter turns off the advanced goals.
- 2:45 Peter moves on to add Home Team. He is pressing the text where it says, "home team name". Might be more intuitive, if the user can press the text and this text changes to the name of the team so it doesn't say "Home Team: Vejle FC" or whatever, but it just says "Vejle FC" after the home team name has been added.
- 4:00 Peter is not a fan of having to write in every name, but we knew that this is not the optimal solution. It would take too much of his time, if he had to add every name by himself.
- 4:40 Peter is going to type in a player name and he does this in the wrong team (away instead of home). Maybe we should find out whether this is something a lot of the referees do and probably figure out a way to change the logic of putting in games. Peter started with writing the names of the teams, so maybe the order could be "home team name -> away team name -> home team players -> away team players" if this is what the referees do.
- 5:15 Asks if the DBU-app and RefLevel will be able to work together since he have the info about the teams on the DBU-app.
- 6:15 Wants to look at the info he put in, but nothing happens when he is pressing the match. He doesn't know about the swiping-feature
- 6:20 Accidentally deleted the game. Did not press "undo" in time so the game was lost. Maybe make a bigger notification when a game is deleted, like a pop-up message that asks the user if he/she is sure the game should be deleted
- 6:45 Still don't really understand the swiping
- He ends the test with synchronizing the phone with the watch

E - MOBILE PHONE PROTOTYPE FOR THE INTRO



F - TEST USERS WANTED POSTER

UDSTYR TIL FODBOLDDOMMERE

SMARTERE NEMMERE VANDTÆT

REFLEVEL ER EN SMARTWATCH APP

RefLevel er for dig der er fodbolddommer og som er træt af at skrive dine noter på papir. RefLevel er en applikation til smartwatch, som kan synkronisere alle data fra kampen mellem smartwatch og mobil. Ingen våde papirer, indtast data og andre noter efter kampen, som efterfølgende opbevares i clouden.

Vi er en gruppe studerende fra AAU som har udviklet en række nye funktioner til appen. Appen er ikke perfekt endnu, men vi vil gerne gøre den bedre. Så vi vil være taknemmelige, hvis du kunne finde tid til at kigge på den og komme med dine ideer om, hvordan den kan gøres mere brugbar til din profession som fodbolddommer. Da vi ved, hvor optaget du kan være, mødes vi gerne med dig, når det passer dig. Bare send navn, tid og sted og at det drejer sig om RefLevel i en besked til 27 84 21 63, så kontakter vi dig.

På forhånd tak.

Teamet bag  SportsLevels - "connecting spectators, players, and referees"

www.reflevel.com



www.reflevel.com

G - REFLECTION SHEETS FROM USER TESTS

G1- Reflection of the user test with grassroots referee P. Eriksen

Activity: Ustertest with Peter
 Test of: design_androidphone Other: Test during a game with both phone and watch



Date: 2018-04-07
 Name of the test user: Peter Vestergaard Eriksen
 Responsible for the test: Monika

Reviewed by: Leonora
 Date: 2018-04-27

+ Things which worked:	
1.	The user liked the app generally
2.	WATCH: Giving goals etc., was easy according to the user
3.	Click here to enter text.
4.	Click here to enter text.
5.	Click here to enter text.
6.	Click here to enter text.
7.	Click here to enter text.
8.	Click here to enter text.
9.	Click here to enter text.
10.	Click here to enter text.

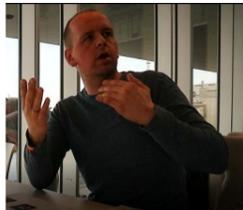
- Didn't work or "Not there yet":		Noted in Trello:	Done:
1.	Not clear what advanced substitution does	<input type="checkbox"/>	<input type="checkbox"/>
2.	It is not clear that the time is per half game	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.	Not clear what advanced goals does	<input type="checkbox"/>	<input type="checkbox"/>
4.	Not intuitive where the user must press to enter name of home/away team (under the text)	<input type="checkbox"/>	<input type="checkbox"/>
5.	User put in player in the wrong team. Maybe change logic of entering teams and players (see notes)	<input type="checkbox"/>	<input type="checkbox"/>
6.	User don't know about swiping to edit/delete the game. Not intuitive	<input type="checkbox"/>	<input type="checkbox"/>
7.	User accidentally deleted game. Make a "are you sure you want to do this"-screen	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.	WATCH: User tried to change the settings for the game on the watch after synchronizing. Did not completely understand, that the settings from phone is transferred to the watch	<input type="checkbox"/>	<input type="checkbox"/>
9.	WATCH: After 30 minutes of the game, the time shows two minutes	<input type="checkbox"/>	<input type="checkbox"/>
10.	WATCH: He has to get used to something with the yellow card. Not clear from the recording what it is, but maybe someone who attended the test remembers	<input type="checkbox"/>	<input type="checkbox"/>
11.	WATCH: User has to be very precise and press hard on the screen for the watch to register goals	<input type="checkbox"/>	<input type="checkbox"/>

Signature: _____

G - REFLECTION SHEETS FROM USER TESTS

G2 - Reflection of the user test with grassroots referee S. Kvist

Activity: Low-fi test with Kenneth Kvist
 Test of: design_androidwear Other: Click here to enter text.



Date: 2018-04-12
 Name of the test user: Kenneth Kvist
 Responsible for the test: Rimon

Reviewed by: Leonora
 Date: 2018-04-27

+ Things which worked:

1.	User likes the indications that he can see there is more pages he can scroll to
2.	User likes that there has been added steps and he can see where he is when adding goals and so (step 1/3)
3.	User likes the idea of yellow background for yellow card etc. Would make it clear what the user is currently doing. Maybe test this idea
4.	User likes the option to expand for extra information in the game log
5.	Thinks the app is generally fine
6.	Click here to enter text.
7.	Click here to enter text.
8.	Click here to enter text.
9.	Click here to enter text.
10.	Click here to enter text.

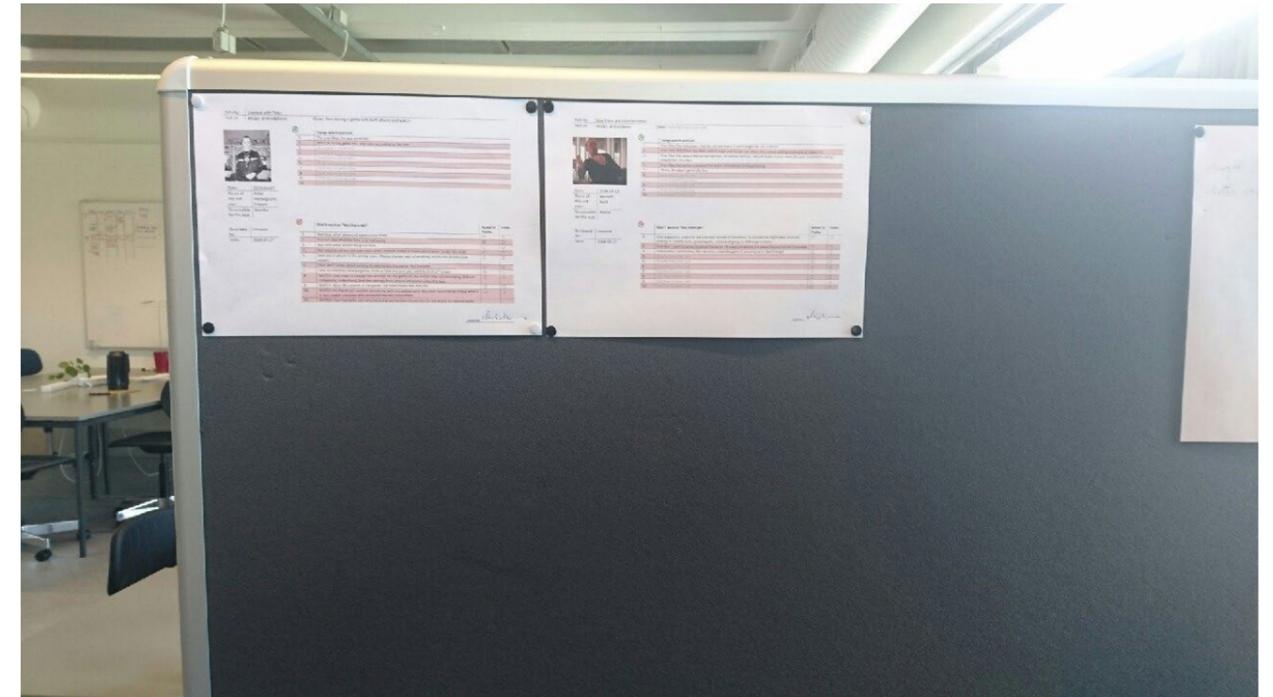
- Didn't work or "Not there yet":

	Noted in Trello:	Done:
1.	User suggests a screen for each setting instead of the menu. So instead he might want to scroll directly to substitutions, game log etc., instead of going to it through a menu	<input type="checkbox"/>
2.	User don't want to swipe to pause the game. He suggests adding the pause-button to the frontpage	<input type="checkbox"/>
3.	User wants a notification, like vibration, when the game is paused, so he don't forget	<input type="checkbox"/>
4.	Click here to enter text.	<input type="checkbox"/>
5.	Click here to enter text.	<input type="checkbox"/>
6.	Click here to enter text.	<input type="checkbox"/>
7.	Click here to enter text.	<input type="checkbox"/>
8.	Click here to enter text.	<input type="checkbox"/>
9.	Click here to enter text.	<input type="checkbox"/>
10.	Click here to enter text.	<input type="checkbox"/>

Signature: _____

G - REFLECTION SHEETS FROM USER TESTS

G3 - Accessible, visible and condensed -working sheets overview



H - EXO AUDIT

AREA	QUESTION	ANSWER	POINTS
HR and Asset Management	1. To what extent do you use full time employees vs. on demand contractors?	We mostly use on-demand contractors in addition to a small full-time core team.	4
	2. To what extent do you leverage external resources to perform business functions?	We emphasize agility - even mission critical functions are outsourced as variable costs rather than fixed costs.	4
	3. To what extent do you own vs. rent the assets in your organization?	We use on-demand assets in multiple business functions (e.g. shared office).	3

AREA	QUESTION	ANSWER	POINTS
Community & Crowd	4. To what extent do you manage and interact with your Community (users, customers, partners, fans)?	The community heavily influences our organization (e.g. product ideas, product development)	4
	5. How do you engage your Community?	No engagement beyond standard customer service (e.g. traditional CRM)	1

AREA	QUESTION	ANSWER	POINTS
Engagement of Community & Crowd	6. Do you actively convert "the Crowd" (general public) into Community members?	We use standard techniques like PR to increase awareness.	1

AREA	QUESTION	ANSWER	POINTS
Engagement of Community & Crowd	7. To what extent do you use Gamification or Incentive Competitions?	SportsLevels does not use gamification.	I

AREA	QUESTION	ANSWER	POINTS
Information & Social Enablement	8. To what extent are your products/services information based?	Our products/services are entirely information-based (e.g. LinkedIn)	4
	9. To what extent is Social functionality and collaboration a central element of your product/services offering?	No social/collaborative aspect is designed into our products/services.	I

AREA	QUESTION	ANSWER	POINTS
Data & Algorithms	10. To what extent do you use algorithms and machine learning to make meaningful decisions?	Not yet. We didn't gather enough data to make meaningful data analysis.	I
	11. Do you share strategic data assets internally across the company or expose them externally to your company?	We don't share data even between departments.	I

AREA	QUESTION	ANSWER	POINTS
Interfaces and Scalable Processes	12. Do you have specialized processes for managing the output of externalities within your internal organization? [by externalities, we mean Staff on Demand, Community/Crowd, Algorithms, Leased Assets and Engagement]	We don't leverage externalities or we have no special processes to capture or manage externalities.	I
	13. How replicable and scalable are key processes outside your core organization?	Most core processes are self-provisioning and executed outside of the organization via a scalable platform (e.g. Firebase, Google Play Store)	4

AREA	QUESTION	ANSWER	POINTS
Real-time Dashboards	14. Which metrics do you track about your organization and your product innovation portfolio? (e.g. Lean Startup Analytics)	We collect all real-time, traditional metrics and use some Lean Startup metrics.	3
	15. Do you use some variant of Objectives and Key Results (OKRs) to track individual/team performance?	No, we don't use anything at this point.	I

AREA	QUESTION	ANSWER	POINTS
Experimentation & Risk	16. Does your organization constantly optimize processes through experimentation, A/B testing and short feedback loops? (e.g. Lean Startup methodology)	There is a lot of disagreement in the team about what the right way is.	I

AREA	QUESTION	ANSWER	POINTS
Experimentation & Risk	17. To what extent do you tolerate failure and encourage risk-taking?	There is a lot of disagreement in the team about what the right approach is.	1

AREA	QUESTION	ANSWER	POINTS
Autonomy & Decentralization	18. Does your organization operate with large, hierarchical structures or small, multi-disciplinary, self-organizing teams?	We have a traditional corporate hierarchy with small, specialized groups operating in silos. One silo does not know what the other does.	1
	19. To what extent is authority/decision making decentralized?	We have a lot of internal disagreement about decision making. In the past, traditional, top-down command & control demotivated team members.	1

AREA	QUESTION	ANSWER	POINTS
Social Technologies & Social Business	20. Do you use advanced social tools for knowledge-sharing, communication, coordination and/or collaboration (e.g. Google Drive, Asana, RedBooth, Dropbox)?	Use of social tools is mandated across the organization as policy.	4
	21. What is the nature and focus of your organizational purpose and mission?	Our mission focuses on our core values as an organization, extending beyond delivering products and services. Connecting referees and DBU in new way.	2

TOTAL
POINTS

44


I - GRASSROOTS REFEREES PRICING TABLE (DOMMERGODT-GØRELSE 2018, 2018)

Spilletid	Godtgørelse	Kampafgift	DBU-afgift	Klubudgift
	pr. kamp			i alt
90 minutter	224,00	55,00	6,00	285,00
80 minutter	200,00	55,00	6,00	261,00
70 minutter	175,00	55,00	6,00	236,00
60 minutter - 11:11	149,00	55,00	6,00	210,00*)
60 minutter - øvrige	149,00	55,00		204,00*)
50 minutter	125,00	45,00		170,00 *)
40 minutter	100,00	35,00		135,00 *)
30 minutter	75,00	30,00		105,00 *)
25 minutter	63,00	25,00		88,00 *)
20 minutter	49,00	25,00		74,00 *)
15 minutter	38,00	25,00		63,00 *)