Title: The distruptive potential of virtual reality in the e-commerce industry. The case study of Turn2VR

Semester: 4

Semester theme:
Entrepreneurial Master

Project period :
01 February 2016-
31 May 2016

ECTS:
30

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Number of printed copies: 1
Total number of pages: 201
Total number of characters (including spaces):230.473
Pages in body: 142
Number of characters in Body (including spaces): 163.250
Number of appendicies: 3
Pages in Appendicies: 59

Synopsis

This Master's Thesis aims at contributing to the existent body of research on the topic of disruptive technologies, by exploring one study case focused on the potential of virtual reality within the e-commerce industry.

The project was aimed at identifying the processes and steps that a potential diruptive technology, virtual reality is folowing alongside with increased adoption. The project showcases an attempt by a startup company, Turn2VR to gain a foothold in a niche market: e-commerce.

For the purpose of testing a partly new approach to Design Thinking and Lean Startup Methodology, in the case of Turn2VR, the two tools were used together in order to treat uncertainty.

Turn2VR is an innovative company that is developing a virtual reality solution to existing webshops. Once implemented, Turn2VR's solution will allow users of any online shop to see and interact with the products that they are about to buy. Adressing the low-end market, Turn2VR has developed its solution in order to be available on any smartphone, Android or iOS, and with any head-mounted display that works with a smartphone (including very cheap Google Cardboard)

The conclusion of the folowed process is that the chosen approach shortened the time necessary to identify the most suitable solution in an uncertain environment. Moreover, the right challenges were also identified easier, allowing for a fast development of the solution.

By signing this document, each member of the group confirms participation on equal terms in the processes of writing the project. Thus, each member of the group is responsible for all the contents of the project.

AALBORG UNIVERSITY
DENMARK

The Disruptive potential of Virtual Reality within the

# E-COMMERCE INDUSTRY

MASTER THESIS

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# ABSTRACT

In the industry of e-commerce and retail that in 2014 has reached the tipping point of 15.4 billion EUR in sales in the Nordic countries, advancements in technological fields such as virtual reality lead towards disruption in the aforementioned industry. Virtual Reality is not a new phenomenon, as it started back in the 50's and has recently gained an increased interest from both the business sector and academia when the advancements within the technology allowed for a broader market reach. Companies such as Facebook, Google, HTC, Sony and Samsung have helped in the process of pushing the technology to the masses. Academia also explored the vast potential of virtual reality within the educational sector, as the use of virtual reality provides a better understanding of hard to grasp concepts and industries.

Moreover, Virtual Reality is a versatile technology which can be applied to a vast amount of industries, with a highly disruptive potential. As a result, the aim of this research is to identify the process that needs to be undertaken by a technology driven Startup Company that aims at developing virtual reality solutions in an uncertain and innovative environment to gain a foothold in the low-end market of the e-commerce industry. Particular focus will be given to the principles of disruption and diffusion of innovation as well as the concept of immersion, brought by integrating virtual reality in the e-commerce industry and the applicability of theories such as the lean methodology and design thinking in incubating Turn2VR.

To be able to increase the viability of the research conducted, the research design of this thesis has been thoroughly developed. This allows the study to be constructed in a systematic way, by making use of two different data collection methods – Secondary and Empirical data. The study begins by analyzing previously conducted research and advancements in academic literature, which result in developing a number of hypotheses. To test the aforementioned hypotheses, Secondary Data is being gathered and analyzed. Lastly, after a thorough literature integration, all the hypotheses are tested through the use of a case study.

Keywords: Virtual Reality, Disruptive Technologies, Immersion, Diffusion of Innovation, Design Thinking, Lean Methodology, Business Model Canvas.

# INTRODUCTION

# INTRODUCTION

## The rise of VR

The emergence of new, revolutionary technologies can always have the potential to disrupt existent solutions, by either overpowering or completely overtaking them. Clayton M. Christensen describes disruptive innovation as being the process whereby a small company or a startup, manages to challenge an established company, with fewer resources by targeting not the most demanding customers but the neglected ones (Clayton M. Christensen 2015). Based on how disruptive the innovation is, it can affect one or multiple industries at once.

In the case of Virtual Reality, the technology is so adaptive that endless uses apply to it, and all the key industries can benefit from it. “Virtual reality or virtual realities (VR), also known by the definition of immersive multimedia or computer-simulated reality, is a computer technology that replicates an environment, real or imagined, and simulates a user’s physical presence and environment in a way that allows the user to interact with it” (Withagen, 2016). “The most recent advances in virtual reality are the possibilities of displaying content on a virtual reality headset (also called a head mounted display), and some simulations include additional sensory information and focus on real sound through speakers or headphones targeted towards VR users” (Best, 2016). “Some advanced haptic systems now include tactile information, generally known as force feedback in medical, gaming and military applications” (Best, 2016).

Furthermore, virtual reality covers remote communication environments which provide virtual presence of users with the concepts of telepresence and telexistence or a virtual artifact (VA) either through the use of standard input devices such as a keyboard and mouse, or through multimodal devices such as a wired glove or omnidirectional treadmills (Best, 2016). The immersive environment can be similar to the real world in order to create a lifelike experience—for example, in simulations for pilots, world-wide VR tourism or online shopping (Best, 2016).

Although the process of adopting new technology can be lengthy at times, the companies that manage to understand its potential impact can benefit greatly from implementing the mentioned technology in their operations and allowing it increased use through time. In the same manner, companies that fail to understand the potential of new technologies or are unwilling to experiment with it, for various reasons, can end up being disrupted and lose their market share. A classic example when the failure to adopt a new technology lead to a significant loss in market share and ultimately to the failure of the business as a whole is Kodak. By choosing not to make use of the vast potential of digital cameras until it was too late, Kodak became one of the most iconic examples of businesses that were disrupted by new technology.

Another well-known example of disruptive innovation that is worth mentioning is the disk drive industry case. When the entrants developed smaller 8-inch drives with lower capacity, the leading companies within the field did not predict the need for smaller drives but for higher capacity disk drives that could store more information, leaving the entrants with an advantage in the niche market of minicomputers. (Christensen, pp. 3-4). Only few “industries offer researchers the same opportunities for developing theories about how different types of changes cause certain types of firms to succeed or fail or for testing those theories as the industry repeats its cycle of change” (Christensen, pp. 3-4).

As mentioned previously, many industries could benefit in many ways from implementing virtual reality technology. Because of the versatility of the technology, it was difficult to make an overview of all the industries where it can be implemented, not to mention analyzing each of them. That is why the scope of this thesis is to investigate how virtual reality

can be applied and can bring value to one specific category: online shopping.

An interesting analysis to make in this industry is related to the buying channels people used over time. Starting with the early forms of trade, which, of course, were occurring offline, and ending with virtual stores, with online shops in between.

The traditional shops (that were not online) are referred to as 'brick and mortar' were the first type of shops which continue to exist today and have a fair market share. However, with the adoption of the internet, there were numerous companies (especially new ones) that decided to operate only online, saving costs and improving productivity. In the same time, some of the already established companies saw the potential of the new channel (at the time) and decided to expand their operations in online, keeping the offline shops as well (although most of the times reducing the number of offline shops). These companies that choose to make use of the both channels (offline and online) are called 'click and mortar.'

In this context, virtual reality can be seen as an entirely new channel comparing to 'traditional' online channels. Because of the high differences regarding functionality and offerings that virtual reality brings to the e-commerce industry, it is fair to assume that it has the potential to replace traditional web-shops.

Given the hypothesis that virtual is 'the new online', a comparison can be made in regards to what happened in the shift from offline to online shops. As in that change, some companies will choose to use virtual reality as the only channel to sell their products.

Moreover, as online-only shops had great success, sometimes higher than 'click and mortar' shops, it is not an unlikely scenario that virtual-only companies will experience the same situation.

However, there will be companies that will choose the second approach as well (the one that 'click and mortar' companies took). These companies will understand the value and potential of virtual reality as a sales channel and will choose to add it to their existing channels.

Although there are similarities between the two shifts, there are also some differences that have to be acknowledged. One of the main difference lies in the adoption rate of each channel. Although most forecasts predict a visible increase in the virtual reality usage in the following years, with up to 40 million users in 2018, that falls way behind compared to internet users (around 3.2 billion worldwide).

The objective of this thesis is to develop a framework for Turn2VR's vision to change the online shopping industry by making it more immersive and by bringing the online shopping experience close to a real world aesthetics. In order to achieve the mentioned vision, Turn-2VR is targeting a niche market, the e-commerce and retail industry to become among the first companies to challenge conventional and international virtual marketplaces.

To address this aim it is important that the customers are aware of the new technology and use it accordingly. These factors, combined with the fact that customers are expected to adopt virtual reality much slower than they have adopted internet lead to the conclusion that a different approach is more suitable for the following years.

Instead of going in an entirely novel area and spending many resources to migrate the customers in this new environment, another approach is to be taken until virtual reality achieves a substantial number of users. This method implies using virtual reality and its benefits as an add-on to existing e-commerce websites. Basically, with this method, Turn2VR is introducing a 'click and virtual', with the goal of merging into a 'virtual-only' while keeping the existing 'click and virtual' department.

# PROBLEM STATEMENT

Research question

The problem statement was developed by the team to have a constant and clear picture over the direction and purpose of this project, which would also act as a broad framework for constructing the structure of the thesis.

In line with the above-presented background, and while considering the academic requirements concerning the theme of this project, the goal was set around incubating Turn2VR. This was done by taking it from being a novel concept with an untested business model to a startup that is ready to launch and gather a significant market share on this newly created market niche.

This project aim is to identify the processes and steps that need to be undertaken by a startup company in uncertain and innovative environment and how can it gain a foothold in a niche market.

Moreover, the problem statement is further broken down into research questions, as presented in the following paragraphs.

The first sub question aims at developing a milestone based development process in a highly uncertain environment. The second one focuses on evaluating the methodologies used for driving growth and coping with disruptive technologies in a startup incubation process. Consequently, the last sub question revolves around the market penetration strategy in a highly demanding industry.

What is the most performance driven process that a startup company needs to undertake to treat uncertainty ?

How might a startup developing VR solutions gain a foothold in the e-commerce market ?

from THEORY to PRACTICE

# FROM THEORY TO PRACTICE

Worldwide, approximately 90% of startups fail, and the reasons behind failing are endless in number. Not to mention that often these reasons are not easily identifiable such as a bad idea, or a non-productive team, neither bad leadership or low to no product-market fit, which is one of the most common mistakes, but errors in business processes and strategy. Given the previously mentioned facts, it is important to establish whether there is an identifiable process that suits most of the startups companies or every company has to develop their strategy and growth engine according to the latest breakthroughs in the field they activate.

In an attempt to jointly address the mentioned issues, the objective of this chapter is to yield a comprehensive overview of the potential impact of virtual reality on B2C e-commerce industry, using a qualitative and quantitative exploration phase.

The second phase consists of an action-oriented plan, aimed at finding the critical information useful for constructing realistic implementation and financial operational plans designed to take Turn2VR to the market.

The conceptual framework touches upon previous academic research that has been conducted on the topic of implementing virtual reality solutions to e-commerce stores while reformulating the assumptions present in existing literature according to the emergence of upcoming trends. Moreover, the process is not based on theoretical-only situations and the analysis of potential scenarios but is tailored as a study case on an emerging startup company, Turn2VR, which will implement virtual reality technology in the existing e-commerce shops.

Previous research has been more inclined to analyze the possibility of implementing such solutions, as well as the factors that have to be taken into consideration when applying it. This area has been surprisingly inconsistent until recently when the technology became feasible for large market adoption. Because the solution became feasible only in the recent years, this is one of the first attempts to document an endeavor from a company to introduce this solution to a larger scale.

## 3.1 Virtual Reality in E-commerce

In what it is defined today as being the dot-com era, there In what it is defined today as being the dot-com era, there is an increase in the number of companies that establish their presence in the market space. It is unbiased to mention that the market areas nowadays are flogged with a vast amount of opportunities and barriers for existing and new firms. Companies that compete for the same customers in the same environment have to adopt a globally oriented mindset while allocating time and resources for global expansion as well as increasing, at the same time, the availability of their products and services worldwide. While being aware of the increase in the competitiveness intensity, technology adoption, and radical innovation, companies should also rely on understanding their customers' needs. To be able to understand customers' needs and develop products or service that would eventually sell, the startup idea needs to revolve around a problem.

One of the barriers that the e-commerce stores face nowadays is the ability to design the web interface effectively to showcase products in a pleasant and functionalway to their customers.

To overcome the barrier, a large amount of research has focused on the emergence of virtual reality in the space of e-commerce and the enormous potential for delivering high-quality online experiences as well as achieving in some cases the equivalent of the real-world shopping experience. The topic has received attention from different academic perspectives as the proposed case by Lee and Chung that touches upon the shopping environment in virtual reality shopping (Lee and Chung, 2005). The study is primarily technological focused, and the scope implies the integration of virtual reality solution to existing web-shops. Moreover, the focus of the research revolves around the technical aspects of designing and implementing a virtual reality shopping environment. Being a technical research oriented study, there are inconsistencies regarding the social aspect and behavioral impacts of virtual reality in e-commerce application (Walsh and Pawlowski, 2002).

Regardless of the technological and design aspects as well as architectures, tools and solutions, the social aspect has to be considered as part of these applications (Maamar, 2003). [ .]

Therefore, to consider the social values of a shopping experience, several techniques have been implemented, ranging from reviews to ratings, to commentaries and product suggestions (based on individual purchasing behavior).

## 3.2 Disruptive Technologies and Disruptive Innovation

Traditionally, developed companies are good at maintaining their position within the marketplace while improving their products or services for the most demanding customer. The mentioned approach is defined as a linear or sustaining development.. [reference] However, in the fast-paced technological progress world nowadays, startup companies are a threat to large corporations that are not agile 'Even if implemented correctly, linear development can lead to failure if disruptive and agiler companies develop at a higher speed.

Consequently, even if the process follows exceptional decision-making and resource allocation that are essential for companies to thrive, there are still high chances for businesses to fail when faced with disruptive technologies. "Disruption or Disruptive Innovation describes the process whereby a smaller company with fewer resources can successfully challenge established incumbent businesses" (Clayton M.Christensen, 2015). Developing the products according to the customer's needs, evaluating competition, investing time and resources in high performing products that would eventually bring a significant profit. All of the mentioned strategies are "by-the-book" but when confronted with disruptive technology, companies that go by the book stumble or fail.

Therefore, disruptive technologies bring to market a very different value proposition than had been available previously (Christensen, 1997). While assuming that established companies produce products that lead in the mainstream markets, products that are based on disruptive technologies have other value propositions for niche markets and those are "cheaper, simpler, smaller and frequently more convenient products" (Christensen, 1997).

Thus, developed companies can follow disruptive technologies if managed accordingly. Companies are often forced by their customer to stick with the existing strategy that thrived for a period of time, but when disruptive technology occurs, companies can either change their strategy according to the trends and accept the new emerging customers orcontinue on the same path an fail.

In time, companies, decision makers, and managers have been confronted with these types of decisions that can either make or break a business. As an example of businesses that managed to face disruptive technologies by changing their strategy was the case of the Quantum's

3.5-inch drive. When their employees spotted a potential market for their 3.5-inch disk, Quantum's executives have decided to fund the project and retain 80 percent ownership, instead of letting the innovative team leave and start a new firm that would commercialize the idea. By making this decision, Quantum had become the largest unit volume producers of disk drives in the world in 1994. (Christensen, 1997)

The context where the disk drive industry is being analyzed is in between 1975 and 1994, and the analysis is done on all the companies that were activating in the industry. Moreover, Clayton M. Christensen argues that by having access to a database of information allowed for a thorough analysis on several critical factors such as: "identifying the firms that led in introducing new technologies, the diffusion of technology through time in the particular industry, and the capability to measure the impact that each technological innovation had on several factors, such as capacity, speed, and other parameters of the disk drive performance" (Christensen, 1997).

Moreover, managing and developing a business in disruptive and normal conditions, the choice of which customers the company will serve has enormous strategic consequences. (Christensen, 1997)

The understandings depicted from analyzing the process of coping with disruptive technologies from the disk drive industry are significant. Startup companies that follow a disruptive path or prove to be disruptive start by targeting a niche market, then work their way on gaining a foothold on a mainstream market, by either offering better quality products at lower prices or by delivering more sustainable services/products. The process is adopted by innovative companies that know when to allocate resources and time into a potentially disruptive business.

Resource allocation and resource dependence are particularly important as theories that apply in the cases of disruptive technologies. If we take, for example, the attempt for people to fly as an analogy to resource dependence, all the attempts were extreme failures as they were consistently fighting fundamental laws of nature(-gravity, Bernoulli's principle, drag and resistance) but when those laws were understood, success came rapidly [The Innovator's Dilemma, Chapter 5, Clayton M. Christensen, pag. 108]. The same principles apply to business development. When companies harness the principles of disruptive innovation and resource allocation and dependence respectively, the chances of achieving success are increasing exponentially.

Given the fact that leadership is more crucial in coping with disruptive technologies that with sustaining ones, there is a need for more advanced tools and techniques that should be developed for managers and leaders alike, to cope with the emergence of disruptive technologies. Despite the fact that real leadership in managing disruptive technology pays back into the growth potential of the firm, they often fail to take the lead (Christensen, 1997). Companies that activate in large, established markets are often held captive by their customers. To be able to shift from an established, high paying market to a new, niche market, companies need to understand that "disruption is a process." To give an example, the first mini-computers were disruptive not just because they were targeting low-end markets, nor because they were categorized as superior to mainframes in many markets but because of the journey they have followed from achieving a foothold in a lower-end market and upscaling to the mainstream ones. (Christensen, 1997)



With Turn2VR, the aim is to develop a highly scalable business model in a blue ocean market . When done correctly, a business model can take a startup company from the low end of the market to the mainstream markets, increasing the chances of success and profitability. Even though the process is lengthy at times, with a qualified team and perseverance even the smallest startup can turn into highly scalable businesses.

For example, when Netflix started in 1997, their service was perceived as invaluable for most of mainstream customers, who at that time were Blockbuster's customers. However, when "Netflix started streaming movies over the internet, the company did eventually become appealing to Blockbuster's core customers, […] and it got there via a classically disruptive path" (Clayton M.Christensen, 2015) [Christensen, Raynold and McDonald, What is disruptive innovation?, pag.163].

Again, Uber is being referred to in today's academic literature as being among the most disruptive companies, which has achieved extraordinary growth. On the other hand, Uber did not followed a disruptive path, which by definition is, targeting a niche or low-end market and then move to the mainstream ones. According to Clayton M. Christensen, "Uber's financial and strategic achievements do not qualify the company as genuinely disruptive-although the company is almost always described as being "disruptive" (Clayton M.Christensen, 2015)."

### 3.3 Virality and Growth engines

Considering the novelty of the technology being used to develop the Turn2VR application, the startup relies on a widely known mechanism of growth, namely viral growth.. For viral growth to be attained the products or services developed need to be designed from the start to "encourage viral growth" (Brown, 2015). Applications that go viral have the right combination of hooks designed into the user experience, a value proposition aligned with viral mechanics, and a use case that drives the cycle time of the invite/referral loop (Brown, 2015).To be able to calculate the viral growth coefficient (K) of Turn2VR's application, the team has first to identify the number of new users that a user brings with him.

For example, when Dropbox, the cloud storage company, started using the viral growth mechanism, they have begun by offering 500MB of cloud storage for every new user brought in by a referral, while both users received a compensation of 500MB. The mechanism allowed the company to experience a high increase in their user database.. In Turn2VR's case, , the team needs to identify the number of invitations "i" that each user sends out in one cycle of the loop which is then multiplied by the conversion rate "conv%." The conversion rate is the rate at which invitations convert into new users.

Assuming that Turn2VR has "50" customer and all of them send "10" invitations for their friends to sign up, that would translate into a "15%" conversion rate, which means that every user will create 1.5 new users (Brown, 2015)

With a (K) of "1.5%" the user base grows exponentially, where the speed at which users move through the loop becomes the gating factor[reference]. Depending on the time frame needed to get through the loop, the startup could experience explosive growth. if the loop takes a few hours for building the users base

For Turn2VR to maximize the (K) coefficient, the semester group would need to improve the conversion of invites. This could be achieved by either developing creative test invites and adding a call to action button to the application or by testing different approaches in reaching out to cus-

tomers, such as social, e-mail, SMS, or even reminder e-mails.

Another critical factor for achieving a high viral growth coefficient is the time cycle. Therefore, designing for viral growth also means designing for speed through the viral loop.

The formula for calculating the time cycle goes as follows:

“Users (t) = Users (0) *K (t/ct+1)-1”

Where:

- Users(t) = Total users at any given time
- Users(0) = Turn2VR’s original user base
- K = viral coefficient
- t = time in days
- ct = time it takes to complete one pass through the viral loop

For Turn2VR to be able to make use of the viral growth engine, the team must first implement and collaborate with one of the customers from Turn2VR’s target market. Again, by implementing Turn2VR’s application, the team can start testing the mentioned assumptions as well as the viral growth engine mentioned above.

### 3.4 Business Model Canvas, Diffusion of Innovation and The Innovative Core

To be able to map out Turn2VRs approach in building a startup company, the team decided on using the Business Model Canvas. The tool was developed by Alexander Osterwalder to make the process of mapping out the core of a business in only nine building blocks. The building blocks are structured with a holistic approach, mapping both the “backstage” of a business, information which is not accessible by external individuals, referred to as ‘Key Partners’; ‘Key Activities’; ‘Key Resources’; and Cost Structure. The Front Stage, which includes: ‘Value Proposition,’; ‘Customers’; ‘Customer Relationships’; ‘Channels’ and Revenue Streams, contains information which is visible to anybody outside the company.

The development and implementation of the tool referred to as the “Business Model Canvas” allows companies to explain their business concepts easily to either investors, stakeholders or other external parties without the need of developing a business plan.

Consequently, the team has also analyzed the pace at which companies are  growing by looking into the theory of ‘diffusion of innovation.’ The mentioned theory aims at making a thorough analysis of “how, why and at what rate new ideas and technology spreads” (Rogers, 2003).

A successful innovative growing start-up needs a team, trust, and traction; and it has to show proof of concept, business, and scale. To be able to showcase the mentioned values, the team needs to be able to communicate them to external stakeholders. To have success, the innovative startup, in this case, Turn2VR has to work on building innovative solutions ;  but also consider to improve existing ones In this sense, Turn2VR is facing, to some extent, a radical, innovative challenge; where radical innovation is “A change of frame (“doing what we did not do before)”[Norman & Verganti, 2014]. The radical innovation can act in a form of a new product, a new sales method, a new service or any other breakthroughs in advanced fields. Moreover, the innovative startup also needs to perform incremental innovation, to capture the value of the radical innovation potential.

Consequently, the process of development is to some extent unconversional, different and uncertain and it is defined as being ‘the innovative core’. The innovative core of a startup is the fundament on which the company culture is grown - both internal and external. Thus, the company brand is hence dependent on a continuous cultivation of innovative core.

Usually, the executives or the entrepreneur knows and understands the innovative core of the startup; however it is equally difficult to communicate it, partly because the innovative core is implicit knowledge, and also because the innovative core is formed in time. A process where the entrepreneur gets a deeper understanding of the different experiences of needs in the markets, which the innovative core can offer a solution.

The innovative core is often reflected as a vision for the startup; however the vision is something the company wants to accomplish. The vision is an understanding of the future, which the company wants to be in, where the innovative core is a concept that the company has at a certain point in time. Moreover, the entrepreneur has little to no existing solid frame of reference to draw on to the code of the innovative message, but either way, all the stakeholders around the startup need to understand the innovative core. The innovative message has to be successfully communicated, to grow a successful innovative startup.

With a view to making the external or internal stakeholders understand the ‘promised land,’ the entrepreneur must communicate another frame of reference than a common code, which does not yet exist. Here, the understanding of the need for the innovative core is the only alternative frame of reference. In Turn2VR, the entrepreneurs or executives are often eager to communicate the innovative core of the startup and how it works as a solution; but this will not be understood by the stakeholders if it is not solidly anchored in an understanding of the need for the innovative core.

In addition, the innovative message has to be communicated clearly enough, where it is not only perceived and understood by the stakeholders; it also has to be remembered and used correctly by the stakeholders. In an innovative startup, the stakeholders act as ambassadors for spreading out the innovative core, and to executing on this role, the stakeholders must not only understand the innovative message, but they also need to have the capability to communicate with potential future stakeholders.

### 3.5 KPI’s in SaaS companies

External stakeholders are evaluating a company’s potential by looking at a multitude of metrics but the most crucial ones in SaaS companies are mainly Customer lifetime value (CLTV) and  customer acquisition costs (CAC).  For the team behind Turn2VR to assess these factors, the team started researching on the topic of achievable growth. Moore’s law, explicitly explains in” Crossing the Chasm,” book by Geoffrey A.Moore the diffusion of innovation theory, and claims that “there is a chasm between the early adopters (technology enthusiasts) of a startup’s product and the early majority (the pragmatists)” (A.Moore, 2014). Moore explains that early adopters and pragmatists act differently regarding their expectations from a newly launched product. By looking into the differences, Moore develops a technique that allows startups to cross the “chasm” successfully, by understanding one’s target market, the product concept, positioning within the market, the go-to-market strategy and the most relevant distribution channel and revenue mechanism (A.Moore, 2014).

Crossing the Chasm appears as the same model as “the technology adoption lifecycle, where five main segments are recognized: innovators, early adopters, early majority, late majority, and laggards” (Rogers, 2003). The difficulties that startup companies face is to identify

what segments to target, to make use of each group as a base for marketing to the next group, while presenting the constraints of the transition process between early adopters to early majority (Rogers, 2003)

In Turn2VR, Moore's theory would act as a framework for identifying the early adopters for the startup to get a foothold in the low-end market, as for further in time to be able to achieve growth and expand to high-end markets or pragmatists. Currently, virtual reality is still in the early stages in terms of market adoption. Many of the industry specialists believe that virtual reality is moving from innovators to early adopters, with many arguing that the cross already occurred, and now is starting to be adopted by the early majority.

# CONSTRAINTS

# LIMITATIONS

According to the limited timeframe of this thesis and its hands-on approach, as well as due to the necessity to match the incubation of Turn2VR with the academic requirements regarding the timeframe for writing university projects, limitations were encountered.

The following section provides an overview of general limitations as well as specific ones that are being described in detail in the parts of the project where they were encountered, thus making sure an increased ease of readability of the thesis.

A limitation of this research is that the findings and understanding from the mentioned cases are mostly depicted from cases of companies developing products and software solutions by making use of theories as disruptive or radical innovations. One should not assume that the results obtained from studies conducted on specific businesses or industries apply to any businesses or any industry without refining the concepts.

Moreover, a limitation that the team behind Turn2VR encountered is that the development and implementation of Turn2VR's application should match the timeframe of the semester project. Being a short period of time, the team did not manage to successfully implement the application within the limited timeframe.

Therefore, Turn2VR will only aim at developing a framework that will take the company to the market while adding to the existing processes and research without urging to change fundamental tendencies and strategies that successful organizations and leaders follow.



# DELIMITATIONS

While the 'limitations' section presented the external obstacles that the project faced, this section deals with presenting the delimitations, which are conscious decisions that were performed by the team in order to have a more narrow focus of the project or to maximize its outcome. Firstly, the nature of the theme for this project implies following an entrepreneurial development, that being the focus of it in favor of research-based development. Both were pursued, but the focus was always on having a hands-on approach by using tools such as MVPs, testing, validation, the Business Model Canvas etc.

Consistently, by targeting the e-commerce industry, the team decided to focus the development of Turn2VR's application with the customer in mind. Selecting only online shops that sell high-end products allowed for a narrow focus and a limited market, while considering that the incipient market would be the Nordic countries.

Because of the format and design of the project, thenumber of pages is bigger comparing to the same content but in normal formating - Microsoft Word, Calibry, 11. The total number of characters is: 230473, which account for 76 pages (3000 characters per page usualy in Word), 163250 characthers in the project body (54 pages) and 67223 characters in the appendix (22 pages)

# ENTREPRENEURIAL JOURNEY

# ENTREPRENEURIAL JOURNEY

Turn2VR was born as a concept out of a brainstorming session with the aim of improving industries with virtual reality. When one of the founders had the first interaction with a virtual reality Head Mounted Display, namely Samsung Gear Virtual Reality (VR). it was obvious that virtual reality is an enormous breakthrough in a technology with enourmous potential.

After extensive research about the history of virtual reality and how it failed in the past just because the technology did not reach its peak and it is full potential, one of the first steps taken was to work on discovering a niche market in which virtual and augmented reality would make a significant impact. While reading a report on virtual reality related interaction possibilities, the founder watched a manifesto video on designing a virtual reality interface by a Google employee, Mike Alger. When doing the manifesto video, Mike was still writing his thesis on the topic of "Visual Design Methods for Virtual Reality."

Minutes after finishing Mike's thesis, the founder contacted Mike with the aim of discussing the applications and markets that the technology could potentially improve. The conversation went smooth as one could almost feel the passion and drive that both Mike and the founder had when discussing the "hot topic" of virtual and augmented reality. During the Skype call, they have mentioned dozens of industries that would be improved by implementing virtual reality solutions such as education, tourism, medicine and e-commerce. When mentioning the e-commerce sector, both the founder and Mike had agreed that problems like high product return rate, low customer satisfaction and engamgement, and low retention rate are problems worth solving by implementing virtual reality within the online shopping experience. When discussing the technology and how it could potentially explode, the founder could already describe the user journey.

"The customer goes into an online shop, searches for a product and then he spots the possibility of seeing the product in a virtual environment. He then presses a button which says "See in VR," making the application launch while his phone turns into split screen. Then he places his phone into a Head Mounted Display and 'Voila'; he can interact with the product. "

To make a more structural representation of the development of Turn2VR, a startup development tool was used which was structured in three phases: Idea / Team Fit; Product / Market Fit; Business Model / Market Fit. The Startup development model it is used as a way of visualizing and framing the story behind Turn2VRs' development. The development of Turn2VR does not limit itself to the model as there were consistently more ups and downs during the development phases than the ones presented below. Moreover, the development of Turn2VR is being presented according to the tool framework and in conformity with the sequences of the events.

## 5.1 Ideation

In the Ideation phase, the concept was taken from an idea to a project, where the main focus was to develop a scalable business model for a solution that could potentially disrupt the e-commerce industry. Considering the capabilities of the existing team, which at that time was only consisting of two Entrepreneurial Engineering students, the idea of finding a capable individual with knowledge and expertise in IT development occurred. The team now started searching for capable individuals that could build the project from an IT perspective. Not long after the first week of searching, the team manages to find a developer with experience in PHP, JavaScript, and C++, but since he was already employed, he could not dedicate enough time and resources for the development of the Turn2VR app, so the team decided to let him go.

At the same time, with the knowledge gathered from desk research and interviews, the team decided to write an application for the Entrepreneurial Pilot program. The Entrepreneurial Pilot program acts as a possibility for students that have an entrepreneurial idea to continue working on their startup after finishing the university. The application

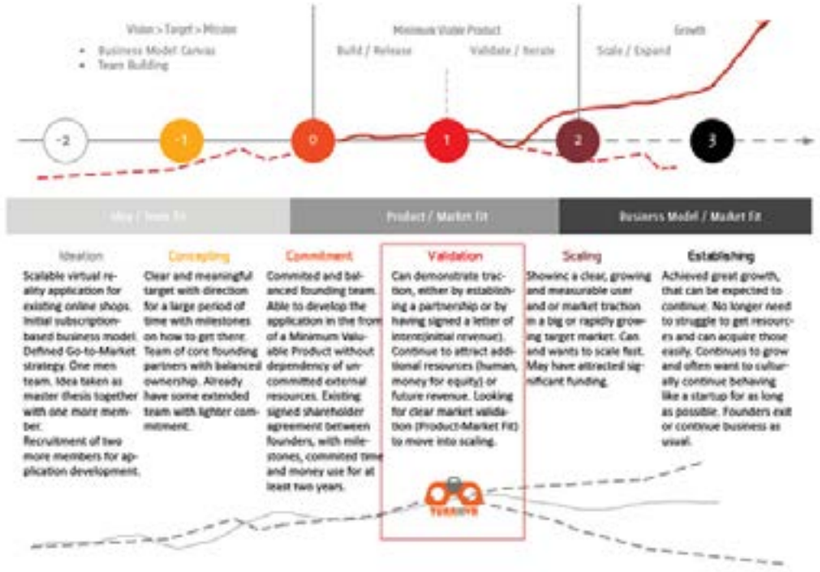



Figure 1 - Startup roadmap tool

consists of a short, two-page description of the entrepreneurial idea, with explanations regarding the idea, the market potential, the scalability and the competencies within the team. For Turn2VR to increase their acceptance chances, the team contacted a representative of the Growth House (Væksthuset Nordjylland) in Aalborg to write a recommendation letter that would act as proof of concept, vouching for a proper business idea. Another recommendation that Turn2VR received was handed by Morten Dahlgaard, Senior Consultant and Head of Entrepreneurship at SEA – Supporting Entrepreneurship at Aalborg University. Both the application and recommendation letters for the Entrepreneurial Pilot can be found in Appendix.

While working on building the startup, both of the founders were also involved in a non-profit organization, namely Kickstart Aalborg that aims at building the strongest student entrepreneurial ecosystem in Aalborg. During that month, the team behind Kickstart Aalborg and the founders of Turn2VR were working on opening the Startup Café Aalborg in partnership with Business Aalborg, the next hotspot and 'go to place' for new and existing entrepreneurs in Aalborg. At the launching event, the team was also present and managed to recruit one more developer, who worked with the founders before, during a globally known competition for entrepreneurial ideas, Startup Weekend.



## 5.2 Concepting

With the concept in mind, the founders started to assemble the funding team across all key functions, such as IT development, design, business development, sales, and finance. Thanks to the network developed within the city of Aalborg, the process was not cumbersome as most of the recruited team was suggested by individuals within the entrepreneurial environment.

At the core, the team behind Turn2VR views virtual reality as an enhanced medium for immersive experiences, ranging from entertainment to training travel and education training to health, industry education and commerce. Virtual Reality provides a new

platform for makers, designers and technology enthusiast to explore and build experiences that resemble or even exceed ordinary moments by making them more engaging, entertaining and immersive.

Another action which was immediately taken by the founders was to recruit another IT developer, who also participated in the same competition with the team and was still located in Aalborg. At this time, the team started to strengthen, as the capabilities within allowed for creating a scalable business model, a first working prototype, and a landing page.

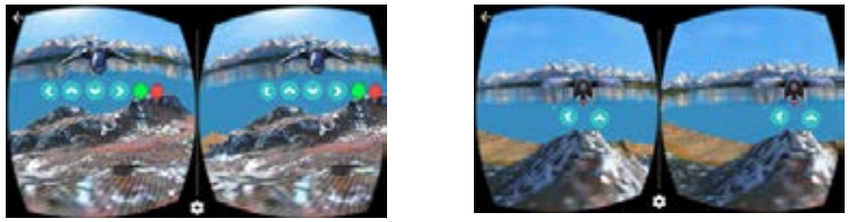


Figure 2 First prototype - Turn2VR (second and first interaction)

Short after creating the first prototype, a co-creation workshop has been planned to develop the Turn2VR application further according to the users' needs. The workshop was held at the Startup Café Aalborg, and it is described in detail further down this reportIn chapter.7 Product Development. While working hard on getting the features and functions in place for the first developed prototype, an opportunity for seed funding emerged, namely the Innovation Award Grant. The Innovation Award is a national business plan and explainer video competition for innovative ideas that are highly scalable and potentially disruptive. The team applied for the grant within the time frame, and the results are to be released before the end of June. The application and a link towards the explainer video can be found in Appendix.



In the attempt of reducing the development costs of Turn2VR, the team applied for one of Microsoft's program, namely Microsoft BizSpark, meant at helping startups succeed by giving free access to Microsoft cloud services, software and support.

BizSpark gives startups three years of free software, services, tech support, and Azure cloud. The startup can qualify if it is less than five years old, is privately held, and earns less than $1M annually. Moreover, at the end of a three years' time, the startup can keep all the software that have been downloaded at no cost [Microsoft website]. With that service being granted for Turn2VR, the startup managed to save more than 750$ a month in cloud services for a three year period. That accounts for 27,000$ in savings for the Turn2VR team.


Figure 3 - First landing page

## 5.3 Commitment

In order to keep the new acquired 'employees', the founders decided to give incentives in the form of a number of shares of the company for the IT developers and at the same time work on making the shareholders agreement which would act as a 'go to document' that keeps the boundaries between the founders and the co-founders' rights and responsibilities in the company and also to ensure that the both the founders and co-founders would avoid misunderstandings and disputes in the future.

Shortly after a supervisor meeting, the team started searching for potential customers that would allow Turn2VR to implement their application to test out the first working prototype together with the core values that the product would bring to the online shop. After hours of market research, the team identified as a potential customer a local e-commerce, namely Coolshop. To establish a meeting with the executives, the founders started reaching out to their network to find common connections with the founding fathers of CoolShops. Shortly after reaching out, the team has managed to set up a meeting with Mark Nielsen, the founder and CEO of Coolshop.

Another program that was successfully backed by Supporting Entrepreneurship at Aalborg University (SEA) is the Spin – In program; a program that was initiated as a support program for startups companies that get out of the university. The Spin-in program is meant at matchmaking startup companies with established companies so that both parties can benefit from each other's intellectual capabilities, know-how and expertise. In Turn2VR's case, the Spin-in program brought a successful partnership with Nordjyske Media, a media company based in Aalborg that runs for over 250 years. Details about the collaboration with Nordjyske Media will be presented below in the Validation chapter.

To be able to bootstrap for a longer period the team had to recruit also people with capabilities in design. The process of recruitment was handled by the founders through word-of-mouth, without posting any job openings on the platform or social media channels. After learning that the process of recruitment usually takes much time, the team started has tried another approach, this time with working on making job opening ads onand social media posts to engage with a broader audience. as well as begun to send direct e-mails to contacts that they already had on their network. In a couple matter of dayshours, the job opening add worked successfully, as there were already four applicants to the virtual reality UX/UI designer position. The job opening ad consisted of a short description of the company, the aim, roles and responsibilities within Turn2VR. For the design position, applicants needed skills and expertise within Unity 3D or Unreal for volumetric layouts and prototyping; 3D Max, Maya, Cinema4D or Blender for environments and 3D UI meshes and Photoshop, Illustrator and Sketch for asset creation.

The founders ended up recruiting two of the applicants that are both multimedia students, which have had experience in the field of virtual and augmented reality before, working on multiple university projects that involved the creation of such content. After recruiting the design applicants, the team seized the opportunity of giving a presentation of their concept in front of an audience of more than 200 students for recruiting purposes in marketing and sales. The opportunity was provided by the team behind "AAU Inkubator" and was facilitated together with UCN's personnel by launching the pitching event, called Recruiting and Startups.

Considering that the team was at the moment consisting of six members, with knowledge in business development, IT and design, the development of Turn2VR's application was advancing. The new acquired members started developing environments for the second prototype of the application.


Figure 4 Inside view of the Turn2VR's second prototype (flat)

For designing in the virtual space the team used a technique called cube mapping that allows design to be executed on four different dimensions. The tool used is described in detail in the chapter Workshop 1.


Figure 5 Inside view of Turn2VR's second prototype (curved)

After designing the first prototype, the need of developing a landing page occurred. When it comes to startup companies, a landing page is a vital aspect to building an audience and making a first impression. For that particular aspect of Turn2VR's development, the founders have arranged meetings with two experienced designers that are part of the entrepreneurial environment. After recruiting one UX/UI designer, which used to work with one of the founders on one of his previous startup, the founders have met with an identity designer, with the aim of creating a brand image that would resonate with the aim and vision of Turn2VR. The rebranding and identity shift will be explained in detail in the Landing page sections.



## 5.4 Validation

As the importance and the outcome of valuable validation become increasingly important in the startup community, the tools and methods used become important factors in determining the value of a business. In order to validate the Turn2VR's concept application, the team released a survey that would allow potential customer to either certify or deny the assumptions that the team had in terms of potential improvements that the application would bring to the online shopping experience. Consequently, the potential customers would also validate the existing features of Turn2VR's application and the willingness to pay certain amounts for the usage. According to the feedback received the team was able to build a verified revenue model that is both tested and accepted by potential clients.

Moreover, achieving the milestone of having as partners both KOXION, an online advertising company and Nordjyske Media, an experienced media company, comes as validation for the existing concept. The partnership with Nordjyske Media was concluded based on the agreement that both Turn2VR and Nordjyske Media will be working together to bring value to both companies. In exchange for mentoring, PR, and marketing tools, Turn2VR will bring into the collaboration new acquired know-how and knowledge in building virtual-reality applications for media purposes and broadcasting. The collaboration is set to start on the 16th of August, when both Nordjyske and Turn2VR would start a new cycle. For Turn2VR to reach the into the Scaling phase, the team must prove that the startup achieved Product-Market fit, acquired a number of customer in order to validate the concept and has a thorough Go-to-market strategy.

## 5.5 Next steps

In order for Turn2VR to make proof of concept, the future plans consists of an implementation strategy and collaboration for a period of at least six months with an established e-commerce company. The collaboration would consist of multiple test developed and analyzed according to the assumptions that the team behind Turn2VR made.

# METHODOLOGY

# METHODOLOGY

In the recent times, there has been a rapid shift in the way businesses develop solutions for the customers, from a product-centric approach to a customer-centric one.

This shift was facilitated by the changes that occurred in terms of quality of life, access to information, customer demands and increased competition between companies for the same customers.

The shift was also facilitated by new methodologies and tools, which allowed for a better understanding of the customers and a development process revolved around the customer.

Some of the most important tools that had a big impact on the way companies design their products or services are Design Thinking (DT) and Lean Methodology (LM). These two approaches are highly acclaimed by the academia, business environment and innovation leaders alike.

To start with, DT and LM have a couple of characteristics in common, some of the core ones being the fact that both are aimed at creating innovation and both are based on a user-centric approach.

'User-centered design' is a term that has a broad meaning, usually used to describe design processes where end-users have a saying in the outcomes. It implies involving the end-users, at different degrees, and at different stages of the design process. The term began being used after the publishing of the book "User-Centered System Design: New Perspectives on Human-Computer Interaction" by Norman & Draper in 1986. (Abras, Maloney-Krichmar and Preece, 2004)

Design thinking is an approach developed by IDEO, a global innovation firm, in the late 90s and it aims at solving complex problems and generating innovative solutions. As Tim Brown, the CEO and President of IDEO states,

***"Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success."***

(Brown, 2016)

The Lean Methodology was first introduced in the car manufacturing industry by Toyota, and at the time it targeted the manufacturing process, aiming at optimizing the production processes. [Lean Thinking: Banish Waste and Create Wealth in Your Corporation, Revised and Updated, James P. Womack (Author), Daniel T. Jones, 2003]

Following the success of the methodology, it was then adopted by numerous other industries, such as management or IT development. It has begun being largely used in IT development, where the term 'lean startup' was first introduced by Eric Ries in his book, 'The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses', 2011.

The main purpose of the Lean Startup is to adapt to customers' needs and develop solution based on a user-centered approach. Here, starting from the Lean manufacturing principles, the goal is to eliminate waste and increase efficiency. As Eric Ries states,

***"Lean thinking defines value as providing benefit to the customer; anything else is waste."*** (Ries, 2011)

By now, some differences between DT and LM can be noticed.

To start with, DT is tailored as problem-solving approach, which can be applied to a multitude of areas, while LS, although a problem-solving approach itself, tends to focus on the business environment and creating viable companies. If DT has the user at the core, LS has the customer in focus, another evidence of the strong business focus of the LS.

One of the core differences between the two methodologies is the 'point of departure'. In the LS, there is an initial idea, or vision that is taken through the process, while in the case of DT, the solution is unknown to begin with.

When looking at the study case of Turn2VR, an initial vision was already developed, making LS the methodology that would suit the best. Turn2VR's vision is to introduce VR to

e-commerce industry as a viable solution. However, the team choose to make use of the problem-solving capabilities of DT in order to tackle some of the many uncertainties that come with the filed it is operating in and thus reaching a better documented initial idea that can be further refined using LS.

In the team's view, the two methodologies had different purposes, as follows:

**- Design Thinking was used for problem solving**

**- Lean Startup was used for solution building**

By following this approach, the team aimed at shortening the number of iterations of the Build-Measure-Learn circle.

In the following chapter, the process of using Design Thinking and its outcomes are described.

## 6.1. Design Thinking for problem solving

As previously mentioned, the Design Thinking process does not start from an initial idea or vision, instead it starts from an initial problem or area of concern.

With Turn2VR having the mission *"to make the online shopping experience more immersive, engaging and satisfying for online shoppers with the use of virtual reality technology"*, it is essential to first get a foothold in the low-end market in order to have the possibility to disrupt the up-market.

The disruption theory was developed by Clayton M. Christiansen, in his book 'The innovator's Dilemma: when new technologies cause great firms to fail' in 1997. Following the success of the book and theory as a whole, he then published other books on the topic.

According to Christiansen, in order to reach disruption, there are two paths that can be followed by a company:

1. *Low-end disruption*, which targets customers who do not need the full performance valued by customers at the high end of the market



2. *New market disruption*, which targets customers who have needs that were previously unserved by existing incumbents (Christensen and Raynor, 2003)

Starting from the mission, an initial problem was formulated in order to be further explored through Design Thinking:

***How might a startup that aims at providing VR solutions in the e-commerce industry achieve a foothold in the low-end market?***

The Design Thinking process follows a succession of 5 steps:

*1. Empathy.* This first step is aimed at understanding the users, the context and the relations between the two. In this phase, the designer has to observe, to watch, listen and engage with the users, with the end goal of getting inspiration for the next steps.

*2. Define.* Following the first step, which hopefully provided some inspiration, the second step is to try and narrow down to a more concreted problem that can be tackled. The aim of the second step is to provide focus and clarity ultimately to define the right challenge that can be addressed.

*3. Ideate.* In this step, after a more concrete problem was identified, it is time to propose solutions, using various techniques, such as brainstorming, mind mapping or sketching. The goal of this step is to come up with as many solutions as possible, without killing any of the ideas. At this point, no idea is too crazy.

*4. Prototype.* In this step, a small number of ideas obtained in the previous step are being translated in a form that can be easily presented to the users. The focus is on building simple prototypes that can be used as a tool for the next step.

*5. Test.* The fifth step of the process is aimed at testing the proposed solution with the use of the prototype developed a step earlier. It is important to mention that this is the 5th step, and not necessarily the last one, as, based on the results, the last two steps can be taken for more than one solution, more than one time.

(Stanford.edu, 2016)

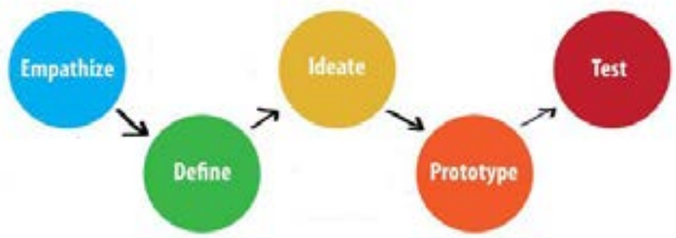



Figure 6 Design Thinking Process

The steps previously presented can be included in a framework developed by The British Design Council, The Double Diamond (DD). The DD framework was used for its structure, clarity and dynamic.

The double diamond is a graphical representation of the design process and it is split into four phases:

*1. Discover.* This phase is aimed at understanding the current condition, being divergent and exploratory.

*2. Define.* This phase is aimed at identifying the most compelling opportunities to pursue further in the process, thus providing focus.

*3. Develop.* In this phase, the challenge defined in the previous phase is tackled, by providing possible solutions which are further tested in the next phase.

*4. Deliver.* The final phase of the design process implies testing possible solutions and finding out which one(s) work the best, then deploying the solution in the market.



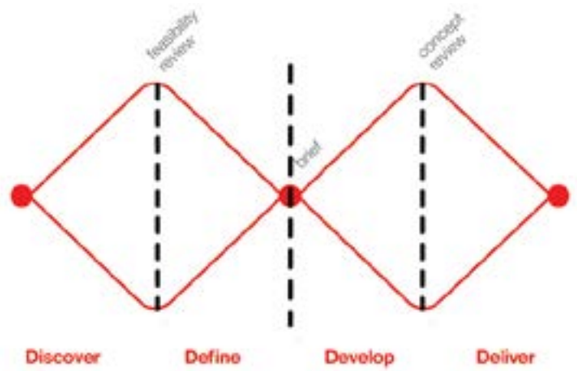



Figure 7 Double Diamond process (Design Council, 2016)

As it can be seen, there are similarities between Design Thinking and the Double Diamond. The steps 1-3 from DT can fit in the phases 1-3 of DD, while the steps 4 and 5 from DT can be included in the last phase of DD.

Thus, with both tools being intended as a way of visualizing and framing the design process, they can be further combined into a unified graphical presentation that takes into account both DT and DD.

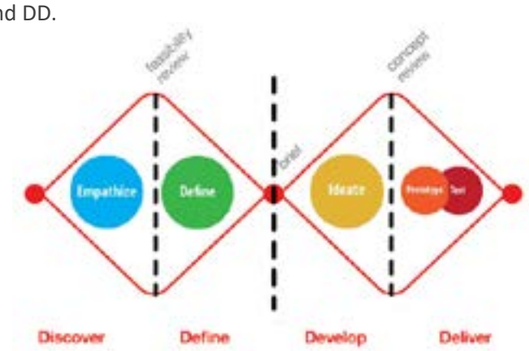



Figure 8 Design Thinking + Double Diamond

At this point it is important to reiterate the reasoning behind combining DT and LS, which is to use DT as a way of defining a more concrete solution which is then tested and iterated using LS. Because of that, only a part of DT is used, namely steps 1-3, while the last 2 steps (which coincide with phase 4 in DD) are replaced with the Build-Measure-Learn from LS.

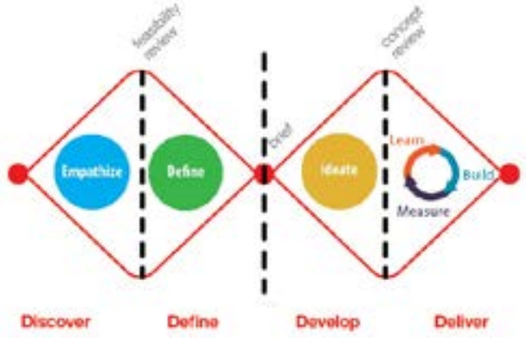



Figure 9 The process followed in this project

In the following paragraphs, the outcomes of going through the first three steps are presented.

### 6.1.1. Discover/Empathize

In the first phase of DT, it is important to keep an open mind and explore all the relevant information and development within the industry, technology, as well as general market trends. Because of the scope of the project, the team has settled on exploring three main relevant areas that have a great impact on the outcome. These areas are:



#### A. Industry

Whenever starting a new business, one of the first areas that need to be understood properly is the industry in which the business is going to operate. Because many industries come with specific strategies, partnerships and knowledge, getting a good understanding of it can help overcome many difficulties, making also easier to asses risks and opportunities.

In Turn2VR's case, the business is operating within e-commerce industry, an industry that has exploded with the rise of internet access around the world. Although it is important to know how it all started and what were the early steps that shaped the $1.3 billion industry (as of 2014) (Emarketer.com, 2016), what is more important from a business perspective is the current stage of the industry. Because of that, the emphasis in this analysis was put on recent developments and stats, rather than on the early stages of the history of ecommerce.

However, a timeline of the most important milestones in the development of ecommerce industry is presented below.

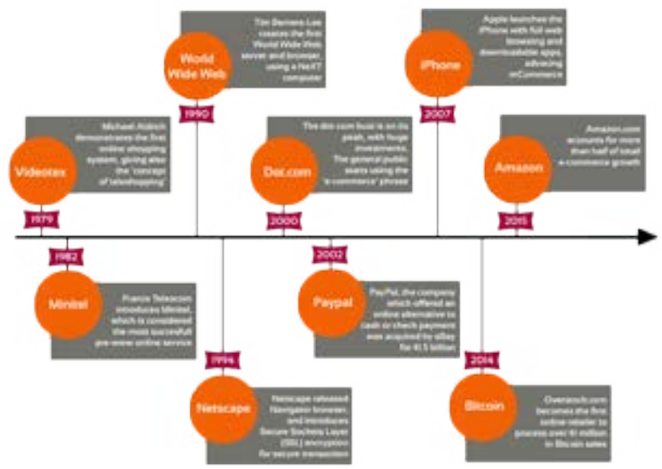



Figure 10 Milestones in e-commerce

With the industry growing at a fast pace, a big number of companies create reports and forecast on what the current trends are and what should be expected in the following years. One of such companies is Criteo, who releases every year a report named 'eCommerce Industry Outlook'.

Criteo is a "personalized retargeting company", founded in 2005 that works with Internet retailers to serve personalized online display advertisements. In 2015 alone, they have analyzed $430 billion sales transactions, which they have used to compile 'eCommerce Industry Outlook 2015', analysis that has been used in this report in order to have an overview of the industry.

According to their report (Criteo, 2016)], there are a number of important characteristics of the industry that should be taken into account. Some of these characteristics are briefly presented below:

**• Mobile share grows to 40% of eCommerce transactions globally**

Together with the increasing reach of smartphones and tablets, people all over the world are shifting their buying habits into using a mobile device as the preferred channel for online shopping. Following the user demand, many of the online shops have optimized their websites in order to be mobile-friendly. Moreover, new mobile payment services are introduced, accelerating the customer willingness to make purchases via mobile phones.

A direct implication of this trend is the increased interest in mobile advertising, many of the online shops allocating a big portion of their marketing budgets to mobile campaigns.

**• Rapid growth in native advertising**

With the growing number of online shops, nowadays is almost impossible for a business to find a niche that has not been explored. Moreover, it becomes increasingly difficult for companies with small marketing budgets to advertise to their target audience, as consumers are becoming more ad-adverse. Because of the adversity of the consumers to adds, it becomes important to 'hide' the ads and mask them in a way so they look consistent with the publishers' website or mobile app.



**• Brick-and-mortar retailers focus even more on online strategies**

Many of the brick-and-mortar retailers become increasingly aware of the necessity of having also an eCommerce approach, a decrease in number of stores that operate only offline being noticed.

Moreover, two important shopper behavior are to be taken into consideration by the businesses that use both offline and online sales channels, namely 'showrooming' and 'webrooming'.

Showrooming describes the shopper behavior of visiting stores to find, try and gather information on the products, but eventually buying online.

Webrooming describes the shopper behavior of gathering product information online, but then making the purchase in stores. Around 10-15% of in-store sales can be directly attributed to webrooming.

An interesting trend that can be observed is that webrooming is emerging as a stronger trend than showrooming, with more shoppers choosing to gather information about products online and buy them in stores. A direct implication can be seen in the fact that many brick-and-mortar retailers start deploying tablets in store and offering free Wi-Fi, hoping to accommodate shopper's behavior.

**• Mobile apps focus shift to re-engagement**

Online stores that have a dedicated app are shifting their attention to existing users that have already installed the app but are not using it. There are many reasons behind this trend, one of the most important one being the increasing cost of driving app installs. Online retailers now understand that not the number of app installs is important, but the number of users, paying more attention to improving their apps, as the main reason behind having an app is to drive customer engagement rather than purchases through the apps.

Conclusions and implications for Turn2VR derived from the industry overview:

o The clear trends of an increasing number of shoppers using mobile devices for their purchases can pose as an opportunity for Turn2VR, as the solution developed implies the use of a smartphone. With an increased number of shoppers using mobile devices as their regular shopping devices, Turn2VR can have an easier adoption rate by users, making the solution feel more natural than for those who usually use desktops or laptops.

o Both webrooming and showrooming trends show a need for a better presentation of the products online. In the case of showrooming, there is a clear need from the shoppers to be able to experience the product in real life. Turn2VR comes in anticipation of these shoppers, providing them with a close-to real world experience by improving the possibility to analyze and to interact with their favorite products from the comfort of their homes. [at any point in time]

o The shift to re-engage passive users of the apps leads to new opportunities for Turn-2VR as one interesting direction for the solution would be the possibility to integrate the functionality of viewing 3D models of the products in VR straight into the online shops' native apps.

## B. Technology

Another crucial aspect of a business lays in the technology used to develop the product or solution. In many cases, the technology is mostly important internally, as choosing the right technology can have a great impact on the business structure, costs and possible applications. In other cases, however, the technology can have a big impact on the customers and/or end users as well, especially when the technology in focus is relatively new or is yet to be adopted by the mass market.



The term 'virtual reality' in its current understanding was popularized by Jaron Lanier refer to three-dimensional realities implemented with stereo viewing goggles and data gloves, developed by his company, VPL Research (founded in 1985). Later, in 1992, Steuer proposes another definition of virtual reality, with a broader understanding, not limiting it to specific hardware. In his view, virtual reality is "a remote or artificially constructed environment in which one feels a sense of presence as a result of using a communication medium" (Steuer, 1992)

Before analyzing the current possibilities and potential of virtual reality technology, a brief description of some of the most important milestones in the history of the technology is illustrated in the picture below.

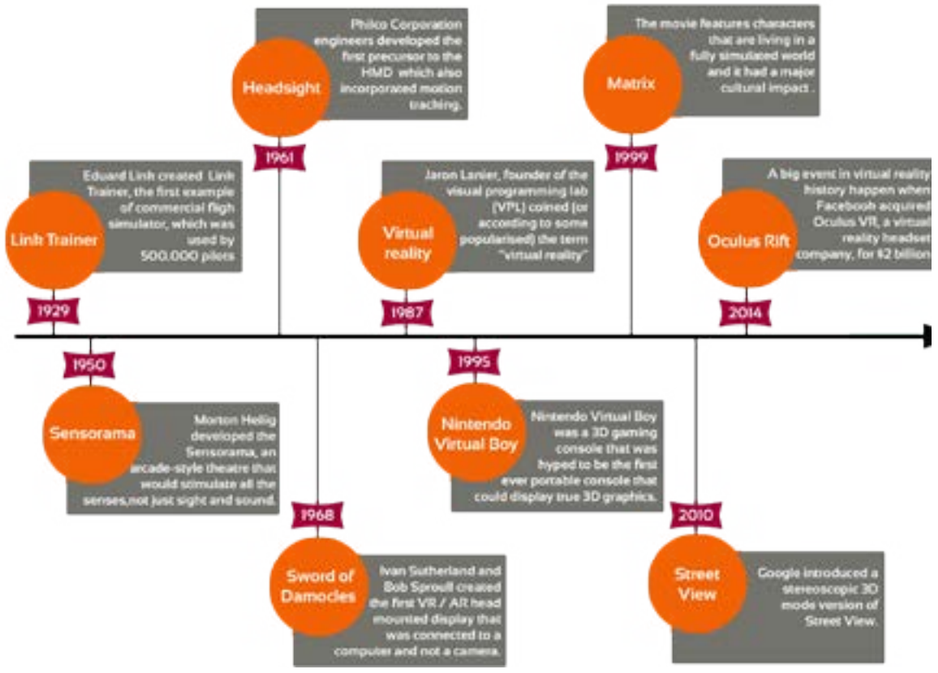



Figure 10 Milestones of virtual reality

When talking about virtual reality solutions, two main components have a big impact: the hardware (usually some form of Head Mounted Display, as well as other controlling devices), and the software (in some cases specific to the hardware).

One important aspect related to the technology is the market acceptance and adoption. If the technology used is already adopted by the mass market, it is easier to use it to create new products or services. However, things look different when talking about a technology that is yet to reach an important market share.

The path that an innovation follows before reaching mass adoption was firstly described by Everett Rogers, in his book, "Diffusion of Innovations", first published in 1962.

*"Diffusion is the process by which an innovation is communicated through certain channels over time among members of a social system. "*[(Rogers, 1983)

Rogers argues in his book that every innovation has to go through 5 phases, before being adopted by the majority of the consumers. These phases are presented in the picture bellow:

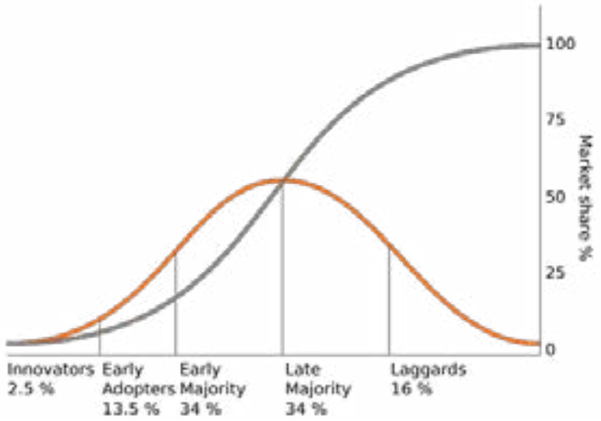



Figure 11 Diffusion of innovation



The five phases are briefly presented below, as described by Rogers:

• **Innovators** are willing to take risks, have the highest social status, have financial liquidity, are social and have closest contact to scientific sources and interaction with other innovators. Their risk tolerance allows them to adopt technologies that may ultimately fail. Financial resources help absorb these failures. (Rogers, 1962)

• **Early adopters** have the highest degree of opinion leadership among the adopter categories. Early adopters have a higher social status, financial liquidity, advanced education and are more socially forward than late adopters. They are more discreet in adoption choices than innovators. They use judicious choice of adoption to help them maintain a central communication position. (Rogers, 1962)

• **Early majority** adopts an innovation after a varying degree of time that is significantly longer than the innovators and early adopters. Early Majority have above average social status, contact with early adopters and seldom hold positions of opinion leadership in a system. (Rogers, 1962)

• **Late majority** adopts an innovation after the average participant. These individuals approach an innovation with a high degree of skepticism and after the majority of society has adopted the innovation. Late Majority are typically skeptical about an innovation, have below average social status, little financial liquidity, in contact with others in late majority and early majority and little opinion leadership. (Rogers, 1962)

• **Laggards** are the last to adopt an innovation. Unlike some of the previous categories, individuals in this category show little to no opinion leadership. These individuals typically have an aversion to change-agents. Laggards typically tend to be focused on "traditions", lowest social status, lowest financial liquidity, oldest among adopters, and in contact with only family and close friends. (Rogers, 1962)

Currently, virtual reality is still in the early stages in terms of market adoption. Many of the industry specialists believe that virtual reality is moving from innovators to early adopters, with many arguing that the cross already occurred, and now is starting to be

adopted by the early majority.

Although the interest shown by the early adopters is a big step in the general adoption, at this point is crucial to have the right approach, as gaining acceptance by the early majority is one of the most crucial milestones in the diffusion of innovations.

Between early adopters and early majority, Geoffrey A. Moore describes a challenge that has to be overcome, which he calls “chasm”. Based on the theory of diffusion of innovation by Rogers, Moore identifies the “tipping point” in the innovation road to mass acceptance.

In the picture bellow is presented the current positioning of virtual reality on the technology adoption curve, as well as the “chasm” described by Moore.

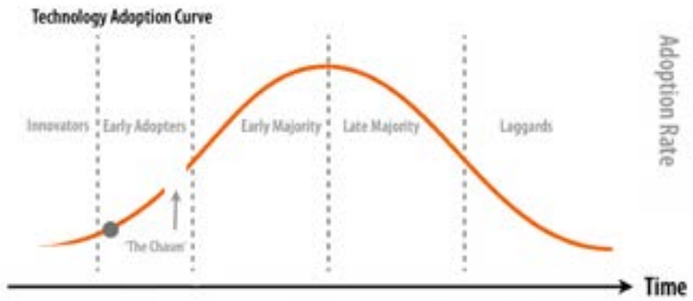


Figure 12 Crossing the chasm

Moore describes the main differences between early adopters and early majority, which ultimately lead to the apparition of the chasm.

The early adopters expect “a radical discontinuity between the old ways and the new”, while being prepared to “bear with the inevitable bugs and glitches that accompany any innovation just coming to market”. (Moore, 1999)



Early majority on the other hand, wants to buy a “productivity improvement”, focusing more on the evolutionary aspect of the innovation, rather than on the revolutionary one. Most importantly, early majority does not accept bugs and glitches, instead looking for solutions that work properly. (Moore, 1999)

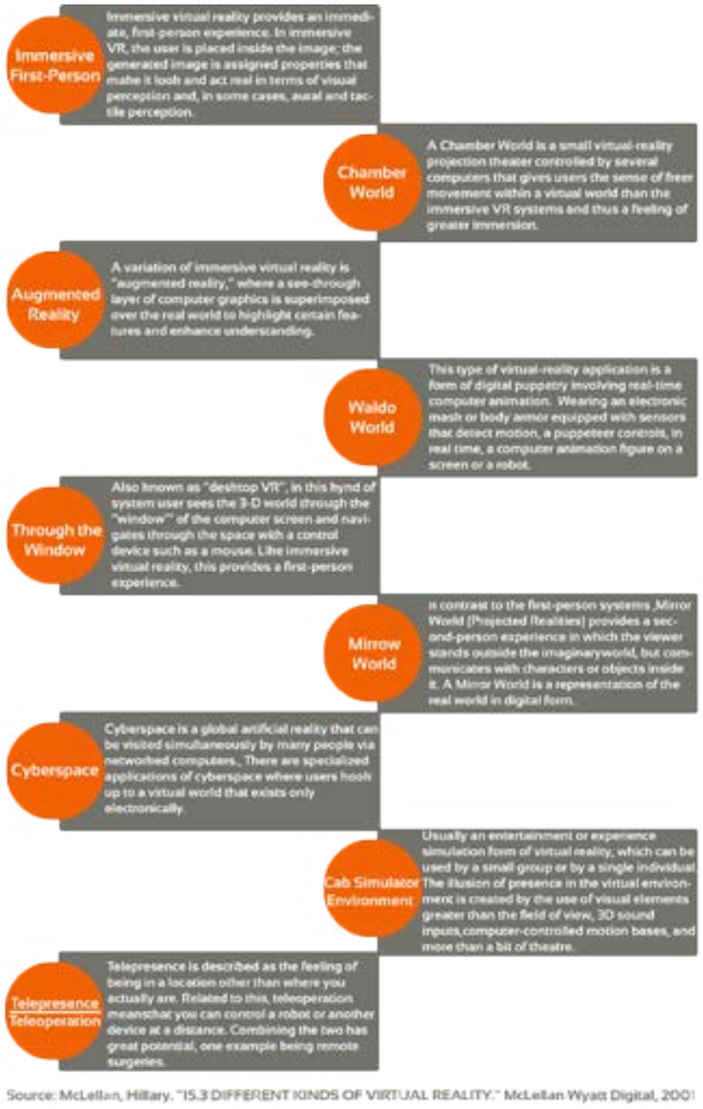
In the current market settings, trying to enter the market with a relevant solution can be both very risky and very rewarding, if the chasm is crossed without any major difficulties. Because of the high risk, many of the established companies will be reticent to such solutions, except for those which are seen as innovators and can benefit for entering this market. However, this leaves place for newly established companies that do not have to worry about their brand and how customers will perceive them after attempting to enter this market, mostly because of the low number of customers (which in some startup cases can be 0).

### C. Competition

In the first phase of DT, after looking at the industry and the technology, a third area is explored, that also has direct implications for Turn2VR’s development: the competitive landscape. The competition is analyzed more in depth in the Chapter 8.2: Competitive analysis.

In this chapter, the emphasis is put on the approach that the competitors are taking in their attempt to enter the e-commerce market with virtual reality solutions.

In the picture bellow, different types of virtual reality are presented:




Source: McLellan, Hillary. "15.3 DIFFERENT KINDS OF VIRTUAL REALITY." McLellan Wyatt Digital, 200

Figure 13 Types of VR

A common approach followed by all the analyzed competitors implies the use of "mirror-worlds" in the development of their solutions.

## D. Sum up of the findings during the discovery phase

Some of the most important findings are presented in the following paragraphs:

The market of e-commerce industry is growing constantly, taking more and more market share of the total commerce industry. Also regarding ecommerce, there is a clear trend of increasing number of users shopping online from their mobile devices, instead of their laptops or pcs. Another interesting and relevant trend lays in the increased interconnectivity between offline stores and their online counterparts, with trends such as 'showrooming' and 'webrooming' playing an important role in the strategies of shop owners.

In terms of technology, one of the most important characteristics that need to be accounted is the state of the technology. Currently, most of the experts agree that virtual reality is just starting to get early adopters on board. However, a massive technology push is seen from various companies and experts, which advocate for the technology in the hope of increasing the pace of its adoption. Companies like Google, Facebook, HTC, Samsung, and even McDonalds are including virtual reality in their portfolio of technologies and are constantly trying to advertise the benefits of virtual reality to the general public. Moreover, having available a great number of virtual reality devices, from the low-end, that offers limited functionality and quality (such as Google cardboard), to the high-end devices that offer a greater functionality and immersion (e.g. Oculus Rift), can prove to be a factor that could push the adoption of technology within different target markets at once.

After the competition was analyzed, a couple of characteristics are worth mentioning and taken into account when developing the Turn2VR solution. Firstly, there is no established competitor on this niche market, as all the competitors are either in the

startup phase, or do not have a compelling track record that could place them as the leaders on the market. Secondly, one characteristic common to all the competitors is that they are using 'mirror-worlds' in their solutions. They are recreating the whole shopping experience within a virtual environment, based on the appearance of physical stores.


Figure 14 Discover phase of DT - Turn2VR

### 6.1.2. Define / Define

After acquiring a comprehensive understanding of the current state of the area that is investigated through the discovery phase, the second phase of DT is aimed at identifying a specific problem that will then be tackled with the hope of finding the right solution.



Between all the problems and opportunities emerged from the discovery phase, one stands out as having the potential to impact greatly the way virtual reality is introduced to the ecommerce industry.

As presented earlier in the paper, all of the competitors use 'mirror-worlds' as they way of introducing virtual reality to the ecommerce industry. By doing so, they recreate a familiar setting for the users, by transposing the real-world store (or a very similar version of it) in a virtual environment.

While this approach has its benefits for the end-users and the virtual shop, it has also its downsides, for all the stakeholders.

In the picture bellow, a couple of the most important pros and cons of using 'mirror-worlds' are mapped out, and are further explored in the following paragraphs.


Figure 15 Pros and cons of using 'mirror-worlds'

**Pros of using ‘mirror-worlds’.**

The first and arguably most important aspect that would lead to choosing to recreate the real shop in a virtual environment is the feeling of familiarity inspired on the users.

Another benefit of using this approach lays in the customization options, which can be unlimited. When after recreating a small shop in virtual environment, another small shop can be recreated, then a medium one, then a huge one, then a mall, and so on. By having such a vast environment, customization can occur at all points, from the lengths of the shelves, to the size of the products, color of the isles, and so on.

Having to create such a virtual environment and to allow customization to such extend can prove very beneficial, as the users and shop owners will have an enhanced sense of ownership. However, it can prove to be also exhausting, as not having a ‘template’ would lead to confusion about where everything is placed, how to navigate and so on. A classic example in this regard is Myspace, which allowed almost full customization, which, in some people’s view, lead to the decline of Myspace. Facebook had a different approach, as they allowed way fewer customization options and instead focused on the functionality and social aspect.

The simplicity in design allowed many companies to have great success (take Apple as an example).

Having a vast virtual space can also lead to an easier implementation of social aspects. If one is picturing a virtual mall, it is fairly easy to imagine a great number of avatars, controlled by users, which interact with each other in many ways.

However, this does not mean that social aspects cannot be implemented in other types of VR solutions, as social aspects come in a multitude of forms, such as social platforms, photo/video sharing platforms, through chat, video calling, audio calling, and so on.

What it does imply, is the fact that the integration of social aspects in a mirror-world can be seen as more natural step, and the types of interaction with other users can vary to a larger extend.



**Cons of using ‘mirror-worlds’**

With all the advantages brought by mirror-worlds come also a number of disadvantages, especially when looking at the current state of the technology, its adoption and the general feeling towards VR.

With such a vast virtual space that the user can explore, it is easy to see how some users would spend a lot of time immersed in such an experience. However, many people experience a feeling of discomfort, in some cases even sickness due to prolonged exposure to virtual mediums. The notion of virtual reality sickness is also known as ‘cybersickness’, a term first used by Joseph J. LaViola Jr., associate professor in Computer Science Department at University of Central Florida. (LaViola, 2000)

Moreover, at the present time, the number of users with access to the necessary technology to experience such a solution is limited at best. The recreation of a virtual world would require a great amount of processing power, which most of the time extends further than the processing power of smartphones, leading to the requirement of using an HMD that is more powerful (and more expensive at the same time).

Lastly, shop owners that would like to use a solution implying a mirror-world type of virtual reality, will have to deal with customer migration.

Jacquelyn S. Thomas and Ursula Y. Sullivan define “customer channel migration as a dynamic process in which a current customer repeatedly makes choices to frequent one of a retailers channel options”. (Sullivan and Thomas, 2004)

When looking at a process of customer channel migration, the company has to assess the related costs and profitability of such choice. After looking at different problems/concerns that arise from the Discovery phase, one has been chosen as the one that

will tackled in the next phases of the process: customer migration. In the picture below is illustrated the Define phase.

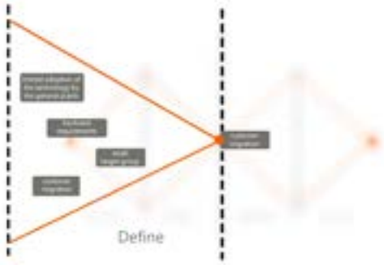



Figure 16 Define phase of DT - Turn2VR

The process of customer channel migration is analyzed further in the next chapter: Develop/Ideate.

### 6.1.3. Develop/ Ideate

The third phase of Design Thinking is aimed at proposing solutions to the challenge decided upon in the previous phase. The proposed solutions will then be analyzed and the most "promising" ones will be then taken further in the process, with the possibility to come back to the pool of possible solutions if the ones taken into the next phase (testing) are proven not to be as efficient as initially thought.

The Develop phase started from the challenge identified in the previous phase: "customer channel migration", which is one of the concerns with using a "mirror-world" approach.

Some scholars have tackled the theme of customer channel migration in the past, looking at the interactions as well as the customer behavior when presented with a new channel. However, almost all of the research previously done revolves around the two main channels: online and offline. In Turn2VR's case however, the customers are presented with two channels, but both are online: one is the existing web shop, while the other is a virtual shop.

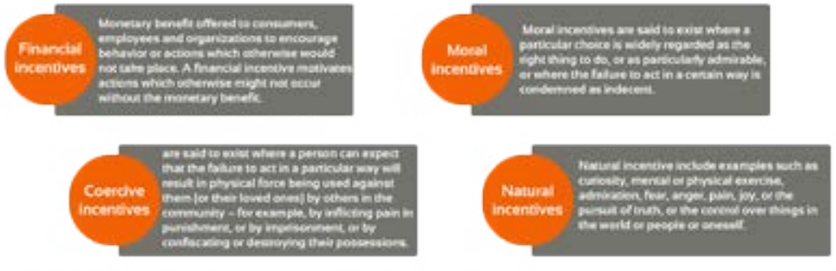
This comes as a limitation, as there are no studies that analyze the implications of switching to a virtual channel (one that makes use of virtual reality technology), making it a very uncertain area.

Nonetheless, a couple of solutions where proposed that might alleviate the pain of customer channel migration, which are presented in the picture below, and further explained in the following paragraphs.


Figure 17 Develop phase of DT - Turn2VR

One of the proposed solutions is to introduce incentives for the users, making the new channel more appealing.

Some of these incentives have proven to be efficient in the past, and can be used in Turn2VR's case as well, except, of course, the coercive type of incentives, which is not something any business would like to be associated with.




Source: Dalbir, Kimiz, "Knowledge management in theory and practice.", 2013

Figure 18 Types of incentives

Another solution proposed is an increase of marketing efforts towards promoting the new channel to the customers. Although a marketing strategy for promoting the new channel is essential, the outcomes can vary, depending on a multitude of factors. One relevant example of a marketing campaign failing to reach its objective can be seen in the case of 3D TVs. After years of promotion and product releases from TV manufacturers, 3D TV failed to be adopted by an important share of the market, some of the most circulated reasons for the failure being : limited access to the technology and limited (and most of the times bad) content.

Another solution that can support and encourage the customer channel migration is "forced" migration. This strategy implies the intentional "cannibalization" of the old channel(s), by either closing it down, or making it less appealing to the customers. Nonetheless, this can prove to be the most risky strategy. If the new channel proves not be as efficient as the old one, the company would experience great losses, in terms of customers, market share and revenue.

Finally, the last proposed solution is to take a step back, see the full picture and try to come up with a different type of solution for introducing virtual reality within ecommerce. This, nonetheless, does not mean that the other solutions will not be employed as well, but the starting point will be a different approach than using "mirror-worlds".

An important factor to consider when developing a VR solution is the number of users with access to technology and their preferred type of HMD. Because most of the VR users access the technology through a mobile HMD (more details can be found in the next chapter), it becomes relevant to target these kind of devices, as the addressable market is bigger.

Secondly, when developing a VR solution for mobile, it is essential to take into account the processing power required. Although smartphones have a great processing power, which is more than enough for any traditional application, things are different in the case of VR. Because the technology is more complicated and not yet fully developed, applications for VR tend to require more processing power than traditional applications, making this a limitation for how complex a VR solution can be when addressing mobile platforms.

These considerations, together with others (e.g. cybersickness, customer migration) lead the team to the conclusion that the alternative solution will not imply the use of mirror-world approach. Instead, the solution proposed is seen as an add-on to the existing website, accompanied by a mobile app that will allow shoppers to see specific product(s),d in the virtual environment. This way, the shopper will be able to experience the exact product that they are looking to buy, the solution coming in helpful towards the end of the buying process, when a thorough analysis of the product is expected.

### 6.1.4. Implications, theoretical example

In this chapter, three different solutions that arise from Develop phase are illustrated and analyzed. Moreover, a theoretical example of migration patterns and its results in each case is proposed.

For the theoretical example, an online shop is analyzed, namely Amazon. In this theoretical exercise, the implications of Amazon adopting the tree proposed solutions are presented.

In order to do this, one Amazon metric is essential: number of customers.  Jeff Bezos, the CEO of Amazon, declared at the company's annual shareholder meeting, in 2014, that the total active user base at that point was 244 million. [(Bishop, 2014)] In order to simplify, in this exercise it is assumed that all the users are customers (all of them buy products).

Another important metric is important for the purpose of the exercise: total number of HMD owners. According to Tractica, a company specialized in technology market research, the total number of HMD in 2016 will reach 15.9 million. [(Motherboard, 2016)]. For simplicity purposes, this number is rounded up to 16 million. Moreover, the analysis splits the types of HMDs into PC (5 million), PS4 (1.7 million) and mobile headsets (9.3 million).

The segmentation of the HMDs is relevant to the analysis, as the solutions using mirror-worlds implies the use (in the majority of cases) of a PC HMD, due to their required processing power.

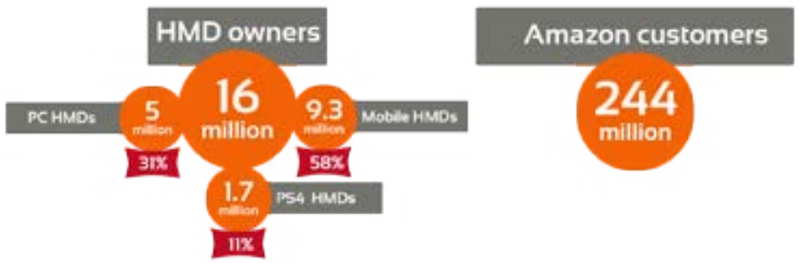



Figure 19 HMD distribution, Amazon customers



From the total number of HMD users, an arbitrary percentage of 1% (0.16 million) is selected as the number of new customers Amazon will acquire thanks to the implementation of the virtual store.

From the total number of users, an arbitrary percentage of 1% (2.44 million users) is selected as the number of existing customers which will automatically migrate to the new channel (virtual shop). Next, the number of migrated customers is adjusted according to the type of HMD needed.

The three proposed solutions analyzed are:

- Virtual shop (mirror world), in parallel with the existing channel.
- Virtual shop (mirror world), closing the existing channel.
- Add-on to the existing web shop.

I. The first solution implies the development of a virtual shop, using the mirror-world approach, while keeping in place the existing channel, the web shop. A simplified illustration of the migration process is presented in the picture below.


Figure 20 First proposed solution

According to the described situation, the total number of users on the new channel (virtual reality shop) is calculated bellow:


Figure 21 Calculations 1st solution

II. The second solution implies the development of a virtual shop, using the mirror-world approach, while closing down the existing channel, the web shop. A simplified illustration of the migration process is presented in the picture below.


Figure 22 Second proposed solution



According to the described situation, the total number of users on the new channel (virtual reality shop) is calculated bellow:

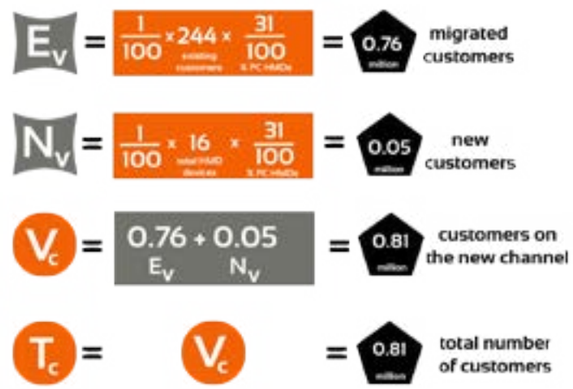



Figure 23 Calculations 2nd solution

From all the proposed solutions, the second one is the least likely to be implemented by any online store, as the new channel is highly uncertain and such a decision would most probably end in a disaster for the company.

III. The third solution implies the development of an add-o to the existing channel, which does not make use of mirror-world and works with mobile phones. A simplified illustration of the migration process is presented in the picture below.

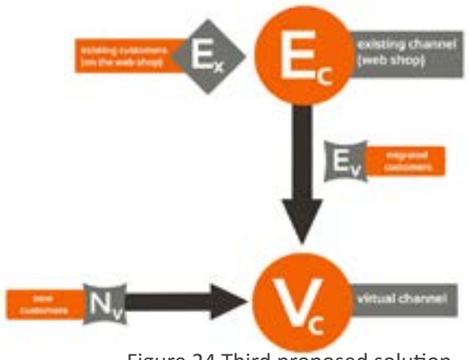



Figure 24 Third proposed solution

According to the described situation, the total number of users on the new channel (virtual reality shop) is calculated bellow:

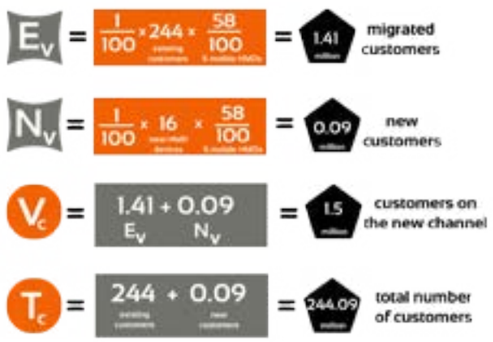



Figure 25 Calculations 3rd solution



It is important to reiterate at this point the fact that these calculations are theoretical, with many other factors needed to be taken into account for a through projection. However, it provides an overview of the possible scenarios and their outcomes.

D. Conclusions

In the picture below, an overview of the outcomes from the three analyzed solutions is presented.

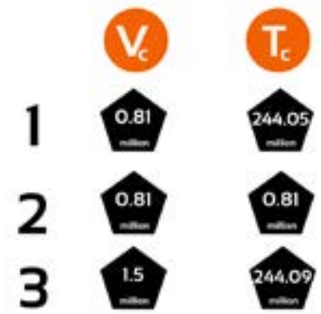



Figure 26 Overview of the 3 solutions

According to the proposed example and the theoretical outcomes of the implementation of the three solutions, a comparison can be made.

It is expected that the introduction of a new channel that uses VR will increase the total number of customers, as long as it runs in parallel with the existing channel. However, closing down the old channel is a definite no at this point, with such an approach having a great negative impact on the number of customers (see proposed solution no. 2)

The increase in number of customers is not significant, due to the proposed scenario, which sets a fixed percentage of the HMD owners as new customers. This is a theoretical situation, in real life outcomes being influenced by many other factors. However, the purpose of this exercise was to evaluate the different outcomes of the proposed solutions, in the same context.

In the proposed scenario, the third solution is the most efficient one in terms of both customers on the new channel and the total number of customers after the implementation of the channel. Looking at the number of customers on the new channel, the number is almost twice as big as on the other two solutions.

### 6.1.5. Outcomes of using Design Thinking for problem solving

**Big question**

When using Design Thinking, it is important to frame an initial question, one that usually is considered too "wicked" to be solved. Framing the question more broadly allow for a larger horizon of problems to be identified and solutions to be proposed. In Turn2VR's case, the big question was:

***How might a startup that aims at providing VR solutions in the e-commerce industry achieve a foothold in the low-end market?***

The formulated question has a couple of key words, which are always considered and kept in mind during the Design Thinking process. The key words in the formulated question are:



*- "startup"*

While going through the DT process, it is imperative to consider at all times that the reason behind using DT, apart from problem-solving, is to help building a high growth startup, with the findings from DT, LM and other methodologies, frameworks and resources used.

*- "VR solutions"*

This key word refers to the type of solution that the startup in question is set to deliver. Here it is fundamental to consider different aspects regarding the technology that the startup will employ to develop and deliver the solution.

*- "e-commerce industry"*

After defining what is the end goal (building a high-growth startup) and the type of technology used (VR), another crucial aspect is to frame the industry in which the startup aims to operate in. In Turn2VR's case, the industry that is going to be addressed is a billion dollar one, namely e-commerce.

*- "low-end market"*

Finally, after the industry was also defined, it is time to define some of the characteristics of the market to be addressed. In Turn2VR's case, because it has the potential to disrupt the way shoppers interact with their providers (online shops), an emphasis is put on the low-end market.

**Discover**

Having the goal to gather as much information as possible about the settings of the formulated question, during the discovery phase three main areas were investigated:

*- Industry*

The end-users of Turn2VR are online shoppers, putting them at the core of DT process. However, the end-users are different from the customers, thus it is required to

focus on both of them. After looking into the history, size and current status of the e-commerce industry, the current trends were also analyzed and their implications for Turn2VR were assessed. Some of the most important findings after looking at the industry are: the size of the industry is growing rapidly, with an estimated value of $1.3 billion; online shopping is seeing an increase in mobile devices as preferred medium for shopping; increased interaction between online and offline channels from the shoppers.

- *Technology*

As the technology employed by Turn2VR is critical for its success, an analysis was conducted, and the key findings are as follows: although the buzz around VR is only a recent thing, the technology has been out there for years, but was immature and not developed enough in order to be appealing for the mass market; gaining important traction, VR is already adopted by innovators and it's making its way into the early majority; challenges are still present, but the general trend seems to point into the technology being accepted and used at a large scale.

- *Competition*

Because Turn2VR is operating with a new technology (in terms of practical applications, as the technology has existed for years, as mentioned before), and within an industry where no other companies has seen significant traction using said technology, a closer look was taken on the existing competitors and their way of addressing the market. Some of the key findings from this are: most of the competitors analyzed create their solution using a "mirror-world" approach; there is no competitor with compelling track record; most of the competitors are startups, with no big company trying to enter this sector (most recent entry is EBay, who partnered up with Myer to deliver a similar solution).



**Define**

After gathering information about the settings in which Turn2VR is set to operate in, a more specific problem is defined. After several problems have been assessed, as well as their impact on the further development, a more specific problem has been identified: customer channel migration.

As this is, in the team's view, one of the most important challenges to be solved, it has been selected as the one to be further addressed in the next steps of the DT process. Moreover, the said challenge is also considered more tangible than the big question, with the team having the capabilities to address it.

**Develop**

This step of DT starts from the challenge identified in the previous step and is set to identify possible solutions that will help overcoming it.

After a number of possible solutions were proposed and analyzed, the team had come to the conclusion that the best approach would be to steer away from developing a solution that is employing "mirror-worlds".

Finally, the solution proposed was refined and described as having "add-on to the existing website, accompanied by a mobile app that will allow shoppers to see specific product(s) in the virtual environment".

**Implications, theoretical example**

After reaching the solution mentioned in the paragraph above, the team set up to do a simulation in order to see if the solution is the most efficient one. For the simulation, three different approaches to developing a VR application for web shops were considered:

- Virtual shop (mirror world), in parallel with the existing channel.

- Virtual shop (mirror world), closing the existing channel.

- Add-on to the existing web shop.

After running a simulation for all three solutions, with Amazon as an example of web shop that could employ a VR solution, the numbers pointed out to the third solution (add-on to the existing website) as the most efficient one.

## 6.2. Lean Methodology for solution building

As described in the beginning of the chapter, the reason for using two similar methodologies (Design Thinking and Lean Methodology) was the different roles and inputs generated from them.

Design Thinking was used for problem solving, meaning that the core outcome was to reach a "prototype" solution that takes into considerations different aspects, detailed in the previous chapter. After the "prototype" solution was achieved, the next step in the development process is to build the said solution.

The starting point for developing the solution is to have an *"add-on to the existing website, accompanied by a mobile app that will allow shoppers to see specific product(s) in the virtual environment".*

The process of building the solution is a highly iterative one, making use of various techniques to ensure the developed solution is appealing to both potential customers and users.

One of the techniques used by Turn2VR is co-creation, with a couple of workshops being conducted with potential users, in order to test out various assumptions and to hear the user's perspective on different aspects, such as features to be included in the app, their positioning within the app, the interaction with the functions, etc. (more information can be found in chapter 7- Product development)

Gathering input form the users is only one step in the development of the solution, as Turn2VR is using the Lean Startup Methodology in order to have faster, more efficient and effective solution. One key aspects of the Lean Startup Methodology is to build and MVP (minimum viable product) which will be then used throughout the Build-Measure-Learn loop, specific to the methodology. (More information about the MVP can be found in chapter 12 – Minimum Viable Product)

After a couple of iterations, a third version of the MVP is already developed, which includes basic functionality, such as the add-on on the website (for the moment, the add-on in on Turn2VR's webpage), product rotation and zoom, suggested items.

Having the MVP ready, the next step is to measure key performance indicators - KPIs. In order to be able to measure these indicators, a pilot test has to be conducted, in collaboration with a web-shop. Until the moment when the thesis was written, such a collaboration has not been established, despite the efforts from the team members. Nonetheless, Turn2VR is in contact with 2 online shops from Denmark, and such a collaboration is expected to be signed in the following month(s).

Until a collaboration contract is signed with an online shop, work is being done on developing two different versions of the app, in order to have everything ready for testing as soon as such a partnership is achieved.

This leads to another technique that will be employed by Turn2VR, namely A/B testing. A/B testing is a term used to refer to an experiment run by a website (usually), in order to test two different version of the page. Differences can be seen in text, positioning, colors, etc.

Although usually used for websites, the experiment can be run with anything, from products to apps or services. The reason why is mostly used for website lays in the fact that changes can be done at higher speed, and the experiment can be adjusted along the way with much more ease than in other cases.

Nonetheless, Turn2VR is planning on having a similar experiment with the first customer (partner), in order to be able to test some of the core assumptions and develop the beta-version of the solution according to the gathered feedback from the users.

The same approach will be followed for Turn2VR’s website as well, although this in not a top priority at the moment, as the focus is put on developing the solution, in which Turn2VR’s website does not play an important role.

# PRODUCT DEVELOPMENT

# PRODUCT DEVELOPMENT

1st workshop

## 7.1 Workshop - 1 co-creation + testing

The market is usually defined as having two major stakeholders: producers and consumers. The roles of these parties are usually well defined, as follows.

The producer is the 'One that produces, especially a person or organization that produces goods or services for sale' (TheFreeDictionary.com, 2016)

The consumer is the '. One that consumes, especially one that acquires goods or services for direct use or ownership rather than for resale or use in production and manufacturing.' (TheFreeDictionary.com, 2016)

There are a lot of interactions between the two stakeholders, one of the most notorious examples being the Law of supply and demand which is a "theory that prices are determined by the interaction of supply and demand: an increase in supply will lower prices if not accompanied by increased demand, and an increase in demand will raise prices unless accompanied by increased supply" (Dictionary.com, 2016) Here ,the supply is provided by the producers, while demand is provided by the consumers.

However, these interactions start most of the time after the product or service is designed and built by the producer. Traditionally, consumers have little to no direct involvement in the design process.

Value creation is the primary goal of any business. This can be further broken down into two types of value: for the customers and for the shareholders. By creating value for the customers, businesses will ensure that they have revenue by selling its products or services.  On the other hand, creating value for the shareholders, in the form of increases in stock prices, will insure future availability of investment capital to fund operations.

Because of rising consumer demands, commoditization and increasing wealth, experience economy is seen by many as the next step in the evolution of economy. The picture bellow shows different types of economy and what are they offering to consumers (Sundbo and Sørensen,2013)



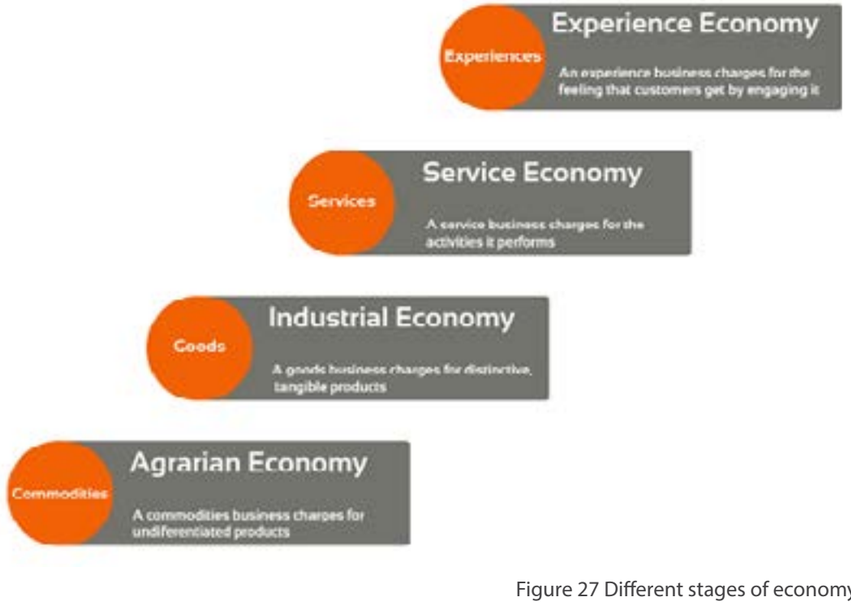



Figure 27 Different stages of economy

Traditionally, consumers had no role in value creation. Their role was solely in the value extraction. However, in the recent times, the process of value creation is rapidly shifting from a product-and company-centric view to a personalized consumer experience.

Co-creation design is a design approach where a multitude of stakeholders is actively involved in the design process. If in the past, consumers were kept out of the design offices of companies, but now they are welcomed in and asked for their input on what the product offered should be and how it should look, feel and function. The process of co-creation is not to be confused with gathering feedback from consumers, as the feedback implies an already implemented solution or at least a working prototype, while co-creation usually start from a blank canvas, or a pretotype at the most.

Below is presented the structure that the workshop followed:

1. Brief presentation of VR.
2. Creative concepts.
3. Turn2VR presentation.
4. Exploratory questions.
5. Testing the prototype
6. Co-creation of the virtual environment.

**Brief presentation of VR**

The participants for the workshop were selected and invited using the Facebook group created for the purpose of raising awareness on the virtual reality technology. Among participants, most of them had little knowledge about the technology and only one of them actually tried the technology in the past. In the Appendix 1, the sign up form for the workshop is presented.

Giving the fact that participants had no in-depth knowledge about the technology, a brief introduction was presented in the beginning of the workshop. This included the history of VR, as well as some examples of uses.

**Creative concepts**

After making sure that all the participants are familiar with the technology, an ice-breaker exercise was introduced. The participants were split into three groups and were given the task to imagine new and creative uses of the technology, with no limitations in terms of feasibility, potential or the like.

Participants had 5 minutes for individual brainstorming, with the help of post-its. Each participant had to write down as many uses as possible on individual post-its in the given

Figure 28 Workshop participants

timeframe. Following that, each group had 10 minutes to discuss each member's ideas and choose one that they like the most. Finally, each group had to choose a representative which pitched the idea in front of all the participants.

**Creative concepts outcome**

The purpose of the exercise was to release the creative potential of the participants and allowing them to explore possible uses of Virtual Reality in any industry/domain.

Because Virtual Reality is a very versatile technology, participants came up all sorts of ideas where this technology could be implemented. Most of the inputs revolved around major topics such as education, long-distance communication, games & entertainment and online shopping.

**Turn2VR presentation**

Prior to the exercise described in the paragraph above, Turn2VR was not mentioned, neither the field of e-commerce.

After the Creative concepts exercise, all the post-its were collected by the organizers. Unsurprisingly, a big number of participants wrote down on their post-its 'online shopping' as an area where virtual reality can be implemented.

There were different variations of 'online shopping', such as 'e-commerce' or 'online buying'. The post-its that had written on them concepts similar to e-commerce were selected and presented to the participants. This was used as a way to introduce them to the workshop's purpose, as well as to Turn2VR and its aims.

**Exploratory questions**

After Turn2VR was presented and the purpose of implementing VR in existing web-shops was clearly articulated, participants were split into two groups and were presented a set of questions which they had to answer together.

The questions were split into two categories and were handed to the participants in the following order:

The first set of questions were aimed at exploring current status of online shopping, the interactions between shops and customers, and how customers perceive certain aspects of online shopping. The questions part of this first set were as follows:

- 'Why do you choose to shop online?'
- 'What makes you go back to a particular e-commerce shop?'
- 'What features make you trust an e-commerce shop?'
- 'What makes you leave an e-commerce shop?'

The second set of questions were aimed at investigating possible implications of introducing VR in the e-commerce environment. The questions part of the second set were as follows:

- 'What impact can VR have on the e-commerce industry?'
- 'Can VR disrupt traditional e-commerce shops?'
- 'Can VR be used to increase customer engagement by e-commerce shops?'

  'If yes, how? If not, why? '
- 'Can VR be used to increase sales of e-commerce shops?'

  'If yes, how? If not, why? '

**First set of questions outcome**

In terms of the reasons for shopping online, the participants listed as being very important value propositions like: lower price, feedback, bigger variety of items, convenience.

When asked about the reasons they use the same online shop for multiple purchases, in multiple instances, the participants believed that the factors that influenced such decision are: discounts, good customer service, uniqueness of the online shop and fast delivery. Having a fast delivery is becoming more and more important for online shoppers, as a recent analysis from PostNord discovered. Over 67% of the Danes expect a delivery time of no more than 5 days, while 13% are expecting their products to be delivered in less than 2 days. This is a continuous trend, every year the percentage of people expect-

ing faster deliveries increasing.  (Anon, 2016)


Figure 29 Expected delivery time, Denmark 2014

Participants were also asked for their opinion regarding the type of features that inspire trust in an online shop. One of the most important features in that regard was the feedback and rating system, which in the participants' view can make an online shop more trustworthy. Some other features mentioned were: easy refund policy, guarantee satisfaction, professional look.

If in the first questions, the convenient, 'good' side of online shopping was investigated, the following questions were aimed at looking on what can go wrong in an online shopping experience.

When asked about what makes them leave an e-commerce website, participants identified mostly functional issues of the website, such as: having too many ads, having a low response time, being hard to navigate. Some of the participants were also concerned with the data that the e-commerce website gather from their customers, participants stating that they would leave the website if they are asked for too much data or if they have information that the data is misused.



**Second set of questions outcome**

The second set of questions were aimed at investigating the participants view on the virtual reality technology and the implications that could arise with the implementation of the technology in the e-commerce industry.

The questions from the second set were arguably harder to answer, as they implied making educated guesses about how the technology could be implemented, comparing to the first set of questions, which were based in a setting that all the participants experienced.

The participants argued that the virtual reality is far for disrupting the e-commerce industry. In their view, the technology can only go in parallel with the existing online channels, and at least for the time being, they do not see such solutions getting hold of a significant market share.

The second round of exploratory questions was one of extremes. There were much fewer answers written from the participants, but in the same time the discussions sparked by these questions were much more engaging comparing to the first set of questions.

Even though the participants did not see virtual reality as a threat to existing shops, they could easily identify ways that the technology could improve key areas of online shopping. It was argued that a solution incorporating virtual reality could increase sales and customer engagement, by providing online shoppers with a 3D experience, close to the real world aesthetics. Moreover, the type of items that could be appropriate for selling with the use of virtual reality were identified as  high-end products, as seen in the figure below:


Figure 30 Can VR disrupt e-commerce shops?

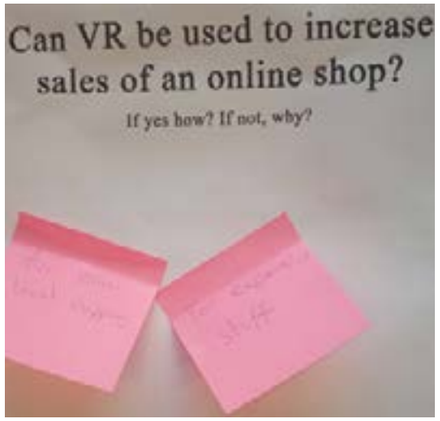



Figure 31 Can VR be used to increase sales of an online

**Testing the prototype**

The last part of the workshop was aimed at imagining how Turn2VR's solution should look like in terms of both what features are required as well as how the VR environment should be designed.

Having in mind that most of the participants have never tried virtual reality before, there was a need for introducing the prototype prior to co-creating, in order for them to have a glimpse of how a developed app would look and how the interaction would take place.

For this purpose, a simple prototype was built by the team and offered for testing to the participants. All the participants had a chance to try the app, as there were 2 devices available, which were also connected to the projector.

The prototype consisted of two 3D models and a number of control buttons that were used to interact with them. An environment was also added, in order for the participants



to have a realistic feel of how the app could look like.

The first 3D model chosen was the one of an airplane, as seen in the Fig.X. Besides the airplane and the environment, several buttons were added, which offered the users the possibility to interact with the 3D model. The users were presented with the option to rotate the model (both on X and Y axis), as well as to zoom (in and out) the 3D model.

Figure 32 First 3D model and buttons, prototype

Users could interact with the aforementioned buttons by hovering over them. The 3D model will zoom or spin in the selected direction as long as the user is hovering over the specific button.

The second 3D model was also an aircraft, but the buttons that accompanied it had different functionality. Besides showing the participants how such an app would look like, there was also a testing purpose to the prototype. With the help of the prototype, the team wanted to test two different approaches of interacting with the buttons. The first

Figure 33 Second 3D model and buttons, prototype

one was by hovering over the buttons, as explained in the paragraph above, while the second one was by pressing the cardboard button in order to interact with the product, as seen in Fig.Y

**Outcome from prototype testing**

Even though the prototype was quite rough and not necessarily in line with the end-product (the 3D model was of an airplane, which is not among the product categories intended for the application; there was no showcasing of the complete solution – including the integration with the existing website), the response from the participants was highly positive, most of them appreciating the presented solution as 'immersive' and they could 'definitely see the potential', as one of the participants stated.

Participants offered their feedback on the prototype, in terms of functionality and looks. Some of the most important comments were regarding the functionality of the buttons.



All the participants agreed that the easiest and most comfortable way to interact with the buttons in the virtual environment is by hovering over them, and not by pressing the physical button every time they want to get a reaction in the application.

Another important observation was made regarding the usability. Participants experienced 'getting lost' and having to take extra steps in order to find the product again in the virtual environment. This was taken into account, as well as the previous input regarding the functionality of the buttons, and implemented accordingly in the second version of the prototype.

**Co-creation of virtual environment**

After the participants had a chance to test the prototype and familiarize themselves with the technology, the last part of the workshop was aimed at co-creating the environment.

For this purpose, a method of environment mapping, called cube mapping, was used.

'A Cubemap is a collection of six square textures that represent the reflections on an environment. The six squares form the faces of an imaginary cube that surrounds an object; each face represents the view along the directions of the world axes (up, down, left, right, forward and back)'. (Technologies, 2016)

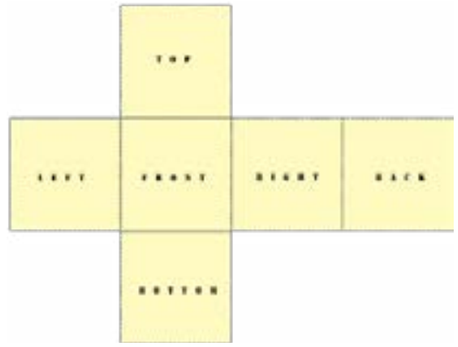


Figure 34 Cube map used during the workshop

Three A3 models of an unfolded cube were printed, in order for the participants to work with them and pinpoint the location of the possible features of the app (see Fig.Z).

Additionally, a number of predefined features were printed, as well as blank ones which participants could fill in according to what features they would like to see in the app. The predefined features were as follows:

- 3D model. The 3D model is the representation of the product that the users are looking to buy.
- Menu. The menu contains relevant fields needed for the users. Participants were also asked to outline the fields present in the menu, as it will presented below.
- Reviews. In this feature, reviews collected from the online shops are displayed, in order for the users to have all the information needed in order to make a purchase decision.
- Suggestions. This presents the users with similar of complementary products to the one they are examining, as extracted from the online shop.
- Color pick. This features is optional, as there are some products that come on different colors and some that have only one color available.
- Product description. A brief description of the product is also suggested as a part of the app.
- Add to cart. This button is linked with the website and adds the product examined to the shopping cart.
- Back. This button offers the users the possibility to return to the previous screen.
- Home. By using this button, the user will be taken back to the main screen where the 3D model is presented.
- See cart. The users have the option to have an overview of all the products that are currently in the shopping cart.



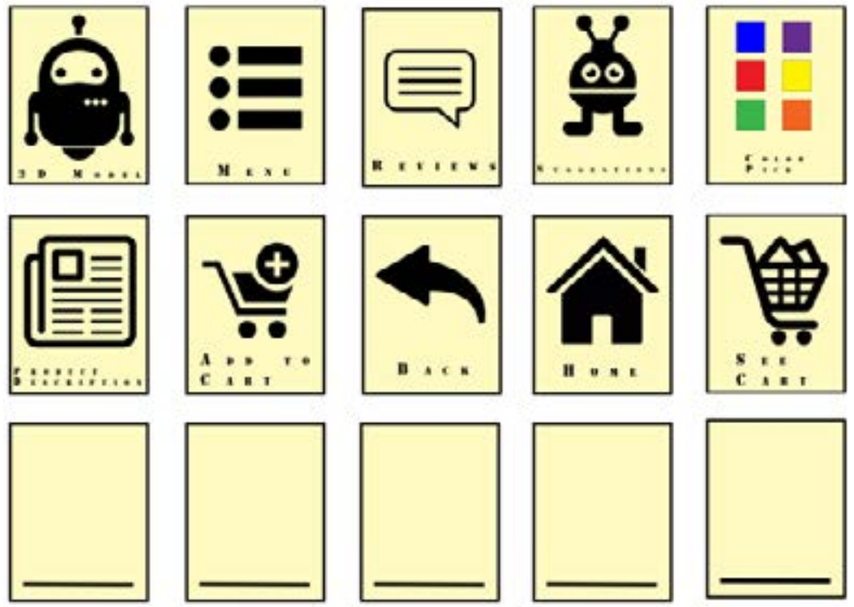



Figure 35 Possible features for the app, both predefined and blank

The predefined features, alongside with the blank ones can be seen in the picture above.

Additionally, participants were presented with a blank menu, which they had to fill in with elements they consider relevant for the purpose of the app.


Figure 36 Blank menu

**Outcome of the co-creation of the virtual environment.**

The co-creation had 2 main purposes:

- To define what kind of features users would like to see in a VR solution
- To pinpoint how these features should be arranged in the virtual environment.

The set of pre-made features included the most common features of online shops. They were selected as there is a need of consistency between the two channels: web-store and the virtual equivalent. Even though there were also blank papers which could have been filled in by the participants with other features they would like, most of the participants considered that the pre-made features were the most suitable for this purpose. However, there was also a new feature, which was overlooked prior to the workshop:proceed to checkout'.

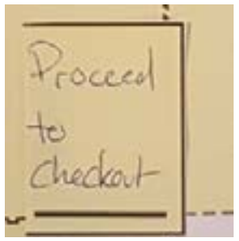



Figure 37 Proceed to checkout

The first purpose of the co-creation was achieved successfully, as the required features were confirmed and new ones were identified.

The second purpose of the co-creation was achieved only partially, as the results were not fully aligned with the research done in the area. One of the main reasons for this was the fact that the workshop spread throughout a couple of hours, by the end of the workshop participants experiencing fatigue and distraction.

Most of the research and tests concluded that the most used features should be placed in front of the user, the other areas (right, left, top, bottom) should be used for feature used occasionally, while in the back there should be  no features, or an 'exploration area' the most.

Designer Mike Alger explains these considerations in his 'VR interface Design Manifesto' (YouTube, 2016)



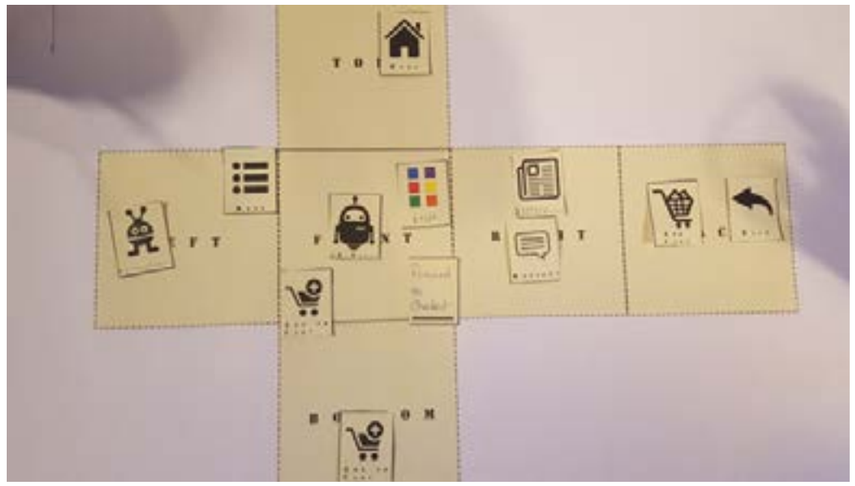


Figure 38 Cubemap filled

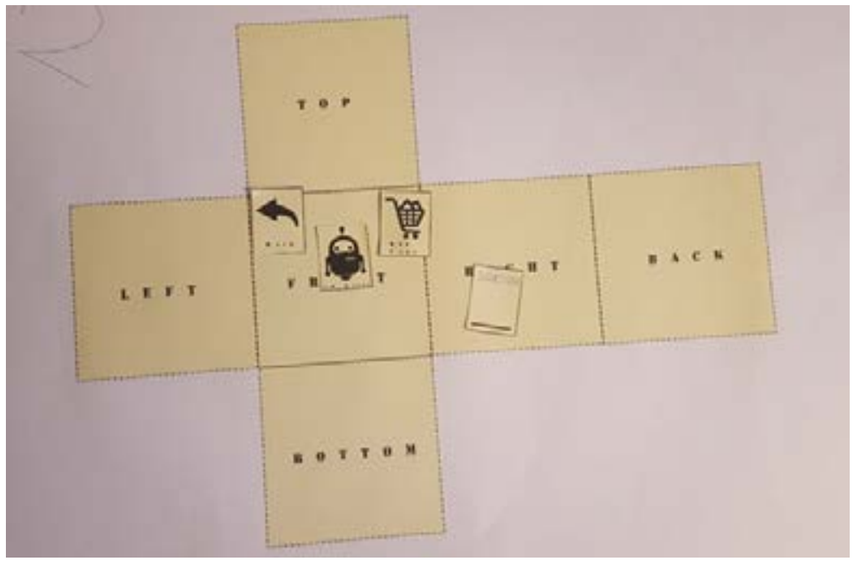



Figure 39 Cubemap filled (2)

The participants used all the areas of the cube, including the ‘back’ to place their preferred features.

However, there were also one example of a more user-friendly placement of the features, using only features that the group of participants considered a requirement for this purpose and placing them only in the ‘front’ and ‘right’ area.

As a conclusion, the workshop achieved most of its goals, with further refinement and work needed in designing the virtual environment and the type of interactions that should occur.

# MARKET ANALYSIS

# MARKET ANALYSIS

This section contains the results of a market study conducted by Turn2VR and designed to identify the general characteristics of the market, its size and trends within it, all relevant elements for Turn2VR's service. These markets include those that relate to e-commerce and retailers in the Nordic region. In particular, the research sought to characterize trends that are relevant to Turn2VR's e-commerce application, as well as those that relate to associated subsectors. The research focused on the primary identified markets for Turn2VR in the Northern Region with emphasis on Denmark and the Danish online shopping behavior. The reason why Turn2VR is looking at Nordic countries as a starting market is mainly that the technology adoption and e-commerce usage and ratings are at its peak and raising. Moreover, the mobile usage in the Nordic countries is steadily growing. From 2014, the people that have finalized a purchase via a mobile device has doubled.

Upon this research, Turn2VR compiled and analyzed the relevant market and technology application information from a broad range of data sources that are known to be of interest to the task objectives. These sources include numerous market research and industry specific databases and thorough commercial gateways. For this process, Turn2VR expects to gather and process pertinent information extracted from different published reports, but also from the desk research performed by Turn2VR's team.

**8.1 The Nordics**

The Northern region is highly evolved, both geographically and as an economy. Given the large geographical area, Nordics have a history in distance selling, which is also the main reason why the e-commerce industry triumphed in the transition from physical store to 'click and mortar'. According to Håkan Ericsson, President, and CEO of PostNord, during 2014 the Nordic population shopped online for a total of 15.4 billion EUR [PostNord - E-commerce in The Nordics, 2014, pag.2 ]. Moreover, the e-commerce related B2C consignments increased 15 percent on the Nordic market in the same year.

Because the Nordic countries have a higher Internet penetration than the average European Countries, the consumers often look online before buying in-store and vice versa. Additional to the internet penetration is a significant number of consumers that are using smartphones or tablets on a daily basis to purchase and surf online. The trend has resulted in consumers demanding more from their suppliers, regarding how lengthy is the shipping process, the terms of shipping and package tracking possibilities.

As online shops represent Turn2VR's market, according to the national e-commerce associations, the e-commerce in Europe is estimated as having an increase of around 15-18% in the number of B2C websites by the end of 2016. That accounts for 715,000 e-commerce shops, growing at a pace of 10%-15% per year [European B2C E-commerce report - 2015]. According to a report on the Nordics e-commerce market done by PostNord, the average number of Nordic region customers, per quarter, that shop online in 2014 account for more than 12 million people. (PostNord, 2014)


Figure 40 Percentage of Nordic online shoppers that shop online each month

E-commerce is revolutionizing one industry after another. It can be a threat or an opportunity depending on how one can approach and handle that change. For a business to adapt, they have to understand today's major trends. Technology is developing at an incredible speed in the current fast pace technological advance world. When it is fertilized with creativity, new products and services will emerge generating new demands. For example, this is exactly what Apple managed to channel by opening up the Application Store to other developers; nobody had predicted the universe of applications that emerged when anyone with a good idea could make it accessible to more than half a billion iPhone users.

In Denmark, the e-commerce market has risen from 42 billion to almost 59 billion DKK over the past three years. Just last year there was an 8 percent rise. It is a massive change that the Danish e-commerce sector is going through, and that almost everyone is a part of. (PostNord, 2014)

A marked trend during the last couple of years is that a rising share of e-commerce is happening via mobile devices, mainly smartphones and tablets. In the previous three years, the proportion of mobile sales has doubled in Denmark. 4 out of 10 online customers state that they have made a purchase via a mobile device over the past six months. (PostNord, 2014)

The product category that dominates the Danish online spending is traveling. According to consumers' estimates, half of the e-commerce of Denmark budget is spent on travel, even though consumers have since long been accustomed to buying holidays online. The tourism industry started selling online at an early stage and has maintained its leading position when it comes to e-commerce development.

One can learn a lot from the data, with lessons that are beneficial both for those who wish to understand current trends as well as for businesses seeking to meet consumer demands. For example, statistics show that 15 percent of customers have canceled an online purchase because their desired payment method was missing. In the U.S., 85 percent of all online shops are adapted to mobile devices (Internet Retailer Top 500 guide), compared to only 58 percent in Sweden (Barometer årsrapport 2014, PostNord), and in Denmark, the number is even lower.

In a sense e-commerce has made the competition conspicuously global. On the one hand Nordic businesses have access to customers all over the world, and on the contrary, e.g. a Chinese or an American player can turn up at any time and challenge them in their home market.

In the retail business consumers now expect to be able to order online (preferably on a mobile optimized website), pick up the items at the post office and to change or return them to the shop. They expect the same service from a brand regardless of the channel (computer, mobile and physical store). In this respect, there is a clear gap between the consumers' expectations and the shops' service. Consumption patterns are changing rapidly, and there is much to learn by studying the development of Nordic e-commerce. Mobile e-commerce in the Nordic countries has increased by 100 percent in three years. (PostNord, 2014)

Danes spent EUR 3.2 billion on online purchases in 2014. (PostNord, 2014) Per capita, Danes spent more than Finns but less than Swedes and Norwegians (PostNord, 2014). The same applies to the total amount dedicated to online purchases in 2014 – Danes took third place among Nordic countries.

One in three Danes shops online several times a month. Danes purchase products online more frequently than their Nordic neighbors (PostNord, 2014) Nearly two in five Danes purchase products online at least once a month. (PostNord, 2014) 66 percent of Danes do so at least once each quarter – 26 percentage points higher than the equivalent figure for Finland. (PostNord, 2014)

Clothing and footwear are by far the most popular product category for Danish e-commerce consumers. During 2014, two in five Danes bought clothing or footwear online. The second most popular product categories for online purchases among Danes were books and home electronics. Considering that virtual reality would improve the online shopping experience by allowing users to see the products from different angles while being able to interact with them, Turn2VR's focus is mainly on targeting e-commerce shops that sell the high-end products. The reason why Turn2VR is targeting online shops that sell high-end products is primarily related to the shopping behavior. Considering that most of the consumers spend hours or even days before making a purchase, when buying high-end products the time allocated for the process is relatively higher. Consistently, the process is associated with a complex buying behavior and also the product – price relativity is suitable for our solution and marketing costs.  Part of the high-end products are home electronics, which are ranked the second most bought products online by Danes, Norwegians, and Finns.

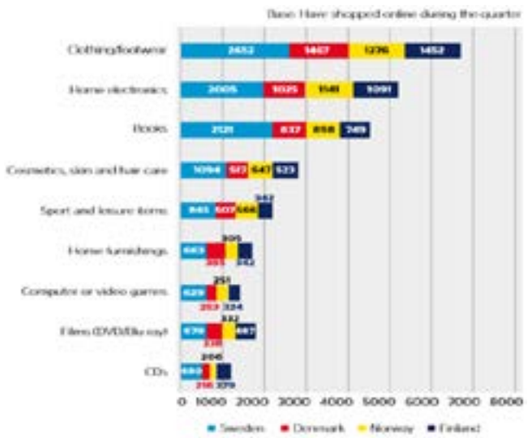



Figure 41 Percentage of Nordic online shoppers that shop online each month

Moreover, one in three Danes shops online several times a month (PostNord, 2014). Most of the purchases of online products are done more frequently than their Nordic neighbors (PostNord, 2014). Nearly two in five Danes purchase products online at least once a month. 66 percent of Danes do so at least once each quarter – 26 percentage points higher than the equivalent figure for Finland. (PostNord, 2014)

The e-commerce market has been steadily increasing in all the Nordic markets. In Denmark, mobile commerce has almost doubled in three years. Mobile commerce in Denmark is most popular among parents with young children. 69 percent have made a purchase via a smartphone or a tablet during the past six months. (PostNord, 2014) There has also been a breakthrough among young adults within the 25-34 age group (58%). Considering that nowadays most of the shopping occurs online, the off-line shopping industry has been disrupted by the wave of online shopping. For example, Amazon was founded in 1994 and by 2004 the company's net revenue reached 6.92 billion dollars. Being among the pioneers of e-commerce has allowed the company to come to an outstanding revenue by 2015, with 107.01 billion dollars (Statista, 2015)

Electronic commerce in Denmark has a turnover of 58.7 billion DKK (PostNord, 2014). That is a rise of more than 4 billion (8%) compared to last year (PostNord, 2014). In three years, e-commerce has increased by 41 percent (PostNord, 2014). The figures are based on an actual increase of about 15,000 online shops in the Nordic region (PostNord, 2014).

During the past year, mobile e-commerce in Denmark has grown by over 200,000 users. 1.7 million Danes have now made a purchase via a mobile device. The number of mobile purchases has risen from 16.5 to 18.6 million, and trends look approximately the same across the Nordic region (Statista, 2015).

Furthermore, the increase is straight up in almost all age groups. Year after year more people are beginning to purchase via their mobile or tablet.The most common reason to shop with a mobile is that it is always close at hand. (PostNord, 2014) A mobile device is meant for going together with customers, even in physical stores. The consumption patterns among Danes continue to intertwine as online, and physical channels become more and more integrated. People search online and buy in stores or the other way around.

It is clear that the mobile customers who spend the most money online use more than half of their online expenditure on travel. Customers who have spent less than 700 DKK during the past three months primarily purchase music, films, and clothing.

The reason Danish customers prefer shopping online is not primarily lower prices or greater selection, even if they are also important factors. To make day-to-day life easier, Danish customers choose to shop online. This includes both men and women—and especially customers shopping via mobile devices. 80 percent of consumers claim that they have purchased at least as much this year as they did the previous year. Everything indicates that the current trend will continue in the following years.

Consumption via mobile devices is accelerating in all age groups, except in the youngest age group who already two years ago experienced their largest rise. More than half of the population aged 25-44 have made a purchase via a smartphone or tablet. At this point, there is definitive the fastest increase in mobile consumption is among older consumers (66-75 years old). Consumers of all ages are going mobile where the share of mobile consumption is up by 50 percent compared to last year. The lowest rate is among pensioners; however even in this age group, 15 percent have now made a mobile purchase.

The proportion that exhibits this behavior is higher among women than men. Older consumers (over 66 years old) say that they used the tablet when they opened an email and clicked on an offer at a much higher rate than the other age groups.

To conclude, the e-commerce shopping environment in Denmark is increasing exponentially, both in the youth sector and among the pensioners. Considering that Turn-2VR's market is represented mostly by consumer electronics, there is a high potential of achieving a foothold in the respective market. Moreover, the clothing industry is a market that the team behind Turn2VR did not research thoroughly, while after conducting the market research, the clothing industry within e-commerce is a market worth considering. Consequently, the shopping industry in heading towards mobile, which in Turn2VR's case there is an opportunity for further focus on mobile advances regarding mobile virtual reality solutions.

The Swedish online market for products and services has increased from 70 billion to over 90 billion SEK in three years (PostNord, 2014). In the past year alone, the market has risen by 12 percent. The major trend in recent years is that an increasing share of e-commerce is happening on mobile devices such as smartphones and tablets (PostNord, 2014). In three years the percentage of mobile purchases has nearly tripled in Sweden (PostNord, 2014).

Regarding online spending, travel is by far the most dominant category among Swedes. According to consumers' estimates, 42 percent of their e-commerce budget is spent on travel (PostNord, 2014). Consumers have been accustomed to purchasing travel and holidays online for a long time. The tourism industry started their e-commerce venture early on and had maintained a frontline position in the development. Purchasing travels online have many tangible benefits. One can do research, compare prices, and view videos of different hotels and travel destinations online.

There is a lot to learn from the data, both for those seeking to understand the times we live in and for the businesses that want to meet the needs of their customers

better. For example, every third consumer cancels their purchase because they were unable to pay by the method they prefer. In the U.S. 85 percent of online shops have adapted their websites for mobile devices [Internet Retailer Top 500 Guide] while in Sweden, only 58 percent have done so (PostNord, 2014). Because the market for many products is global, it is clear that any e-commerce business without a mobile optimized website that is attempting ambitious expansion might want to rethink their strategy.

Mobile e-commerce had its serious breakthrough by 2014. Since then, it has continued upwards in all the Nordic markets. This applies throughout the Nordic region. Mobile purchases in Sweden have developed at a faster pace; increasing in three years by 163 percent (PostNord, 2014). Mobile e-commerce is most popular amongst parents of young children (PostNord, 2014). 68 percent of them have made a purchase with a smartphone or tablet during the last six months (PostNord, 2014). There has also been a significant breakthrough (61 percent) among young adults aged 25-34. (PostNord, 2014)

In Norway, the online market has increased from 51 billion to 78 billion NOK in three years (PostNord, 2014). This is almost ten billion NOK (13%) more than in 2013. In three years e-commerce has seen growth close to 50 percent. The numbers are based on the actual increase across 15,000 online shops in the Nordic region (PostNord, 2014).

The greatest change the last years is that a much larger part of e-commerce is happening on mobile devices such as smartphones and tablets (PostNord, 2014). In three years the share of mobile purchases has almost doubled in Norway.

Subscription to video streaming services is the subscription product category that is growing the fastest. More than a third of consumers currently pay for services such as HBO, Netflix or Viaplay, the most common being families with young children. The tendency to subscribe to newspapers, however, increases with age. Subscription based models are gaining popularity among business and customers alike. The trend is sustained by Turn2VR's approach in having a subscription based revenue model. Moreover, offering a subscription-based model allows for gaining customer insight, which would eventually guide Turn2VR in offering personalized solutions for their current clients.

In the last year alone, the mobile market in Norway has increased by nearly 150,000 people. Almost one and a half million Norwegian customers have shopped using a mobile device. The number of mobile purchases rose from 17.2 to 18.7 million, and the same trend can be seen in all Nordic countries. (PostNord, 2014)

Furthermore, the increase is strong in almost all age groups. More beginners are starting to shop with their mobile phones or tablets each year. Customers are always carrying their smartphones, even when visiting a physical shop. Their consumption patterns are in the process of getting very mixed up; online is intertwined with offline. Moreover, customers have done their research online and their purchases in a physical store, or vice versa. 7 percent of that shopping with a smartphone have visited a physical store while ordering the product online. Customers are spending less than 850 NOK in the past three months, however, are mainly purchasing songs, movies, and clothing.

The same as the other Nordic countries, the reason why customers prefer to shop online is not primarily lower prices or greater selections, even though these are also important factors. Most important is convenience and saving time. Online shopping has become a way to make day-to-day life better. 76 percent of mobile customers say that they have shopped just as much on their mobile devices this year as compared to last year. Nothing suggests that the development is about to slow down.

Nearly 4 out of 10 have shopped using a mobile device in the last six months. Since 2012 this share has increased by 90 percent, and the trend continues to point upwards. Mobile e-commerce has had its greatest breakthrough in the 25-34 year age group and among families with young children, where respectively 56 and 58 percent of online shoppers have made purchases on a smartphone or a tablet. (PostNord, 2014) Older age groups have not adapted to the technology to the same extent. In the 66 and up age group only a fifth of the online shoppers use a mobile device; however this share is steadily rising. There is also a clear distinction between city and countryside; the proportion of mobile shoppers in Oslo is almost twice that in the countryside.

Consumption via mobile devices is increasing significantly across all age groups (PostNord, 2014). More than half of the consumers aged 25-44 have now shopped on a smartphone or tablet (PostNord, 2014). The increase has been the strongest in the oldest age group since 2012, where some mobile shoppers have more than tripled. This is hardly surprising now that almost everyone has direct access to a world of offers at all times.

It is worth noting that 7 percent of consumers have visited a physical store and still ordered the product on their smartphone. As observed already last year, the divide between shop and internet is becoming ever more diffuse; sometimes customers are doing research online and shop offline, other times they do the opposite.

It is also interesting that the share of those who state to have shopped with an application is much higher in Norway than in Sweden and Denmark. This is most likely because the Norwegians are considerably further ahead in making payments on their mobile, such as for public transport.

**Conclusions**

As previously mentioned, the target market was narrowed down to online shops that sell high-end products within the Nordic region. The reason why the team decided to start with the Nordic countries is because both of the founders are based in the Northern Region of Europe and the conditions are also favorable, as an exponential growth in online shops and mobile purchases have been identified.

# COMPETITIVE ANALYSIS

# COMPETITIVE ANALISYS

The competitive analysis is being executed by the team behind Turn2VR to understand the existent competitors and to describe the factors that influence their success, which would eventually drive the revenue generation mechanism. Moreover, the goal of developing a competitive analysis is to get insights on the competitors by placing them in differential groups and establish what attributes makes Turn2VR unique in order to emphasize them when addressing the target market.

The e-commerce industry has been growing rapidly, especially in the Nordic countries. Moreover, the trend of mobile purchases continues to develop, as the process of completing a mobile purchase becomes more easy and handy. With Turn2VR developing virtual reality applications for existing online shops, the team has mapped out the competitors that target the same market as Turn2VR, namely online shops, which sell a wide variety of products. When assessing the competition, several factors with high relevance for the industry have been considered and mapped out.

All the reviewed companies are targeting the online shopping industry, with differentiation points within specific product categories.

## 9.1 Trillenium (http://www.trillenium.com/)

Trillenium is among the main competitors of Turn2VR as they have an established position within the market. Trillenium are currently developing their application for Samsung GEAR VR, with working prototypes on both Android and iOS application store.  Trillenium is developing a proprietary platform where they act as a key enabler of the next phase of online fashion retailing (Seeders, 2015). When it comes to experience within the field of e-commerce, Trillenium has an advantage in terms of having the founder, Hrvoje Prpic, as one of Europe's most successful retail entrepreneurs (Seeders, 2015). His previous exit was one of the biggest domestic IPOs in Croatia and the Central Europe region (Seeders, 2015). In order to get knowledge and expertise in e-commerce market, Turn-2VR is aiming at putting together an advisory board that would allow the team to understand the e-commerce tactics that apply to the majority of the stores and, on the other hand, learn from the challenges present among the industry.

On the contrary, even though Trilleniums' platform connects with existing online retailers, a system that is similar to Turn2VRs' approach, they are focusing on creating mirror worlds. The concept of 'Mirror Worlds' has as an output the creation of a physical store in an online environment, which brings back both advantages and disadvantages for Trillenium. One of the challenges big businesses face when relying on customer carryover is the habitual breaking effort, which Turn2VR removes when keeping the existing online shop and only adding a virtual extension.

Another advantage that Trillenium has is that they could support all devices but their focus at the moment is to make the application available for mobile devices, targeting both Android and iOS app stores. In other terms, Trillenium is at the moment available for mobile only virtual reality equipment, which resembles Turn2VRs' approach. In Turn2VR, the aim is to expand to high-end virtual reality devices like Oculus Rift, HTC vive and the Sony Morpheus Project while building on top of the existing version of Turn2VR's application that would become available on Android, iOS, and Windows phones alike.

The approach Trillenium is currently using is to dig into and declare 'ambassadors for the brand,' which would act as 'early-adopters' or influencers and publicly expose themselves as 'proud-users.' In Turn2VRs' case, the aim would be to partner up with a globally known brand, which would act as a 'business ambassador.' In this way, Turn2VR would benefit from both, the partners exposure and the hype that the use of innovative technologies brings with it.

Trillenium has recently secured the backing of ASOS, a successful online global retailers. The impact of this exciting technology resulted in ASOS becoming a 10% shareholder of Trillenium (Seeders, 2015).

Following the development of the new Trillenium adventure, ASOS is planning to conduct a fuller public launch (Seeders, 2015). Alongside this, and with ASOS approval and encouragement, Trillenium is actively seeking a portfolio of online retail customers (Seeders, 2015).

Trillenium has access to c. GBP 1m in intellectual property in 3D scanning, inventory and design modules from earlier prototypes (Seeders, 2015).

During the first months of 2016 they have secured backing from ASOS Ventures Ltd, a wholly owned subsidiary of ASOS plc (Seeders, 2015). Given the fact that Trillenium has more asstets and it is valuated at $3,600,000 mil according to Seedrs.com, a 10% equity stake from ASOS  is low considering the capital that ASOS has available.

In terms of revenue strategies,Turn2VR differs from Trillenium by offering subscription based models rather then relying on transactions fees from successful conversion of visitors to purchasers (Seeders, 2015).

Trillenium's revenues would  also come from technology licensing plus a revenue share with online retail partners and from brands paying to be part of innovative adventures in a 3D VR shop (Seeders, 2015).

Trilleniums' target market is the expanding circle of ambitious, quality and competitive online fashion retailers in the developed world (Seeders, 2015).

Trillenium's customers would be online retail distribution businesses. We intend to build platforms as a service for them. Our targeted customers need to diversify from pure retail (Seeders, 2015).

They offer 3D and VR scanning and expertise services to ASOS on a preferred bidder basis (Seeders, 2015). In return, ASOS provides them with office space, knowledge transfer and their expertise with fashion and design (Seeders, 2015).

Another differentiation point from Turn2 to Trillenium is their target market. Trillenium is focusing at the moment on the UK online fashion market. They argue that the target market of online fashion is expected to be worth GBP 10bn in 2016, according to new research from Mintel (Seeders, 2015).

## 9.2 Sixense & SapientoNitro – vRetail (http://sixense.com/vretail)

According to Venturebeat, vRetails' mission is to bring the ideal interface for consumer interaction with digital media to the market.

Sixense was founded in 2007 and has been in the market for more than 9 years. In 2016 they have announceed a partnership with SapientNitro and the availability of a VR shopping platform they call vRetail.

Sixense has "recognized that the full potential of a 3D experience would only be achieved by a system that could recognize the user's every movement" (Crunchbase, 2016). With this in mind, Sixense has developed technologies and products to enable the ideal control platform for consumers to interact intuitively with digital media (Sixense, 2016).

According to their website, Sixense has developed a

stand-alone virtual reality application that connects with existing online platforms. Their "new vRetail™ platform represents a merging of entertainment with shopping to bring the best aspects of brick and mortar to e-commerce through VR" (Sixense, 2016).

To start with, "vRetail is using the toy segment as an example, where a consumer can enter a branded store in VR to engage in a fully immersive and interactive energy sword training session" (Sixense, 2016) Comparing with Turn2VRs approach, vRetail is not looking on entering the same market as Turn2VR , making them indirect competitors. Their approach is meant at effectively "reinventing retail by allowing customers to experience products in a way that is not possible through any other medium and can segue into a retail shopping experience in which the consumer is in the mood to buy (Sixense, 2016).

In addition, vRetail argues that by implementing their solution, e-commerce and retailers would improve retail metrics (e.g., by driving customer acquisition and retention and by reducing returns) (Sixense, 2016). In comparison with Turn2VR, vRetail market themselves as social, meaning that customers can shop with friends, colleagues or family in any store across the world (Sixense, 2016). That comes in contradiction with the latest virtual reality advancements, as to be able to socialize in a virtual environment, a platform would require the possibility to render a 3D model of individuals, in real time. The process of rendering and transmitting information across the internet of a person in real time requires high capabilities within computational power, and that is only possible if the end user has access to those resources. Finally, Sixense's argues that their "platform tracks position and orientation data for the user's head and hands at all times, while being able to provide valuable analytics & metrics for retailers to understand how consumers interact with products and to ultimately deliver a better more efficient buying experience" (Sixense, 2016). Turn2VR is also researching the possibility of adding users hands in the virtual environment by making the application available for high-end devices but before going into the high-end market, the team is focusing on mobile devices, as the market is twice bigger than desktop devices.

### 9.3 eBay & MYER

The closest resemblance to Turn2VRs' application comes from a newly established partnership between eBay Inc. the "American multinational corporation and e-commerce company, providing consumer-to-consumer and business-to-consumer sales services via the internet and Myer, a mid-to-up market Australian department store chain" (Influx, 2009). Their application consists of a virtual only department store that allows users to check products in a virtual environment. Moreover, they argue that the application learns from the customers purchasing behavior, giving, in time, personalized products suggestions. The processes of learning from the customers purchasing behavior is called data mining and it is an already existing feature that most of the e-commerce shop already have available.

Figure 42 Screenshot eBay app

On top of having the closest resemblance to Turn2VRs' application, Myer and eBay are using the same go-to-market strategy as Turn2VR. For customers to be able to benefit from the virtual department, eBay is giving away for free 20.000 HMD (Head Mounted Displays) as personalized Google cardboards, while calling the devices, "shopticals."

Figure 43 Screenshot eBay app(2)

Both the companies have made the application available on both iOS and Android while having it deployed only in Australia.

Figure 44 eBay cardboard

The fact that they have only launched in Australia can have an impact on the market adoption. If eBay's approach is increasing exponentially in the Australian market, then Europe and the Nordic countries are still open markets for Turn2VR's application. As both markets are growing, they are both attractive for Turn2VR to be in, but Turn2VRs current operational setup means that the team is more able to compete in the niche market that is developing for customers seeking entertainment and immersiveness while shopping online.

Figure 45 Screenshot eBay app (3)

# BUSINESS MODEL

# BUSINESS MODEL

The term “business model” is nowadays used in any discussion regarding a business, being it a startup, small & medium enterprise or large enterprise, and it became the core of presenting a business.

In his book, Michael Lewis refers to the business model as a “term of art” (Lewis, 2000). This holistic definition is supported by the fact that the term “business model” is used by a consistent number of people, but when asked about the meaning of it, it becomes difficult to explain.

To this day, there still isn’t any standardized definition of a business model, with a number of definitions being cited and used by various actors.

In the picture bellow, some of the most circulate definitions are presented, together with their author(s).


Figure 46 Business model definitions

Regardless of the scholar’s definitions of business models, many see the business model as an overview of what, how and to whom the business is selling its product/service.

For a big period, companies used to develop business plans to “summarize” their business model and make it accessible to potential investors. However, business plans are usually unnecessarily long and complicated, businesses tending to try and include all the aspects that they find important.

This poses as a barrier in a constant changing and uncertain environment, such as the one in which startups usually operate. Because of the high uncertainty, startups need to be able to change and adapt very quickly, making the development of business plans time-consuming and, sometimes, useless.

Moreover, although the information in the business plan is usually compressed and the reader can find all the relevant information, it does not provide a quick, visual sum-up of all the important business aspects. It is also difficult to make rapid changes and to see how these changes can affect other areas of the business, which is crucial for a startup.

These were probably the considerations Alex Osterwalder and Yves Pigneur had as well when they set to develop a tool which will make business plans more visual, adaptive to change and easy to use, while still providing all the important information about the business and the business model adopted.

Although providing a complete overview of the business, the tool developed is usually accompanied by a “traditional” business plan where detailed information for each area can be found.

## 10.1. Business Model Canvas

Developed by Alex Osterwalder and Yves Pigneur, with the contribution of over 470 practitioners from 45 countries, the Business Model Canvas is a highly acclaimed tool by scholars, businessmen, teachers, researchers, investors, founders and the like.

Their goal was to develop a “shared language that allows you to easily describe and manipulate business models to create new strategic alternatives.” (Osterwalder et al., 2010). The focus is put on the “shared language” aspect, the authors aiming to provide

a framework that could be used by anybody, regardless of their field, background, language spoken, cultural differences and so on.

The authors developed the tool around four main areas of any business: “customers, offer, infrastructure, and financial viability” (Osterwalder et al., 2010). Moreover, they have structured the canvas in nine “building blocks” that revolve around these areas.

In the picture bellow, the Canvas is illustrated, as well as the relation between the building blocks and the areas of business. The building blocks are further examined in the following paragraphs.

Additionally, the Business Model Canvas can be divided in “front stage” and “back stage”, according to what outside stakeholders have information about. The “front stage” is visible for anybody with an interest in the business, the information being most of the times transparent. The “back stage”, on the other hand, is not accessible by external people, including more confidential, internal information.

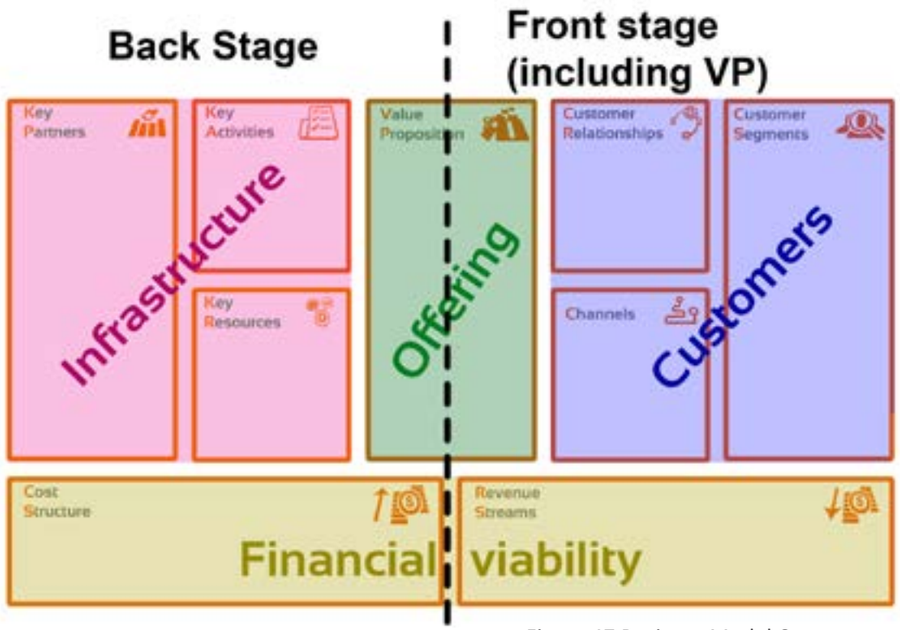



Figure 47 Business Model Canvas

## 10.2. Business Model Canvas – Turn2VR

The team behind Turn2VR has been using the Business Model Canvas from the early stages of the concept, in order to grasp a better understanding of the different aspects of the business. Moreover, during the development of the concept, it was extremely useful to have a tool on which changes can be done rapidly and assessed equally fast.

In the picture bellow, the Business Model Canvas of Turn2VR’s is illustrated.


Figure 48 Business Model Canvas - Turn2VR

## Customer segments

One of the central pillars of any business are the customers, without which a venture is nothing more than a (nice) concept.

In the startup environment, it is a common strategy to tackle a niche market, companies seeking to get a rapid foothold in a market, which is usually done easier in a market with few competitors.

Knowing the customers, their habits, needs, and wishes is increasingly important in the current market settings, where the emphasis is put on delivering the best solutions for the customers. This is even more important in a niche market, where customers tend to have different characteristics than the ones in the mass market.

This leads to the imperative need of segmenting the customers and addressing the ones that are most willing to pay for the startup's product/service. Moreover, a thorough segmentation of customers can lead to diversification of the startup's products/services, in order to accustom the different targeted segments. All these efforts are made by startups in order to achieve the "product-market fit", essential for creating a high growth company. The term "product-market fit" is often attributed to Marc Andreessen, which describes it as "being in a good market with a product that can satisfy that market." (Andreessen, 2016)

In the picture below, the Customer Segments building block for Turn2VR is further addressed, as well as the factors taken into account when segmenting the customers.

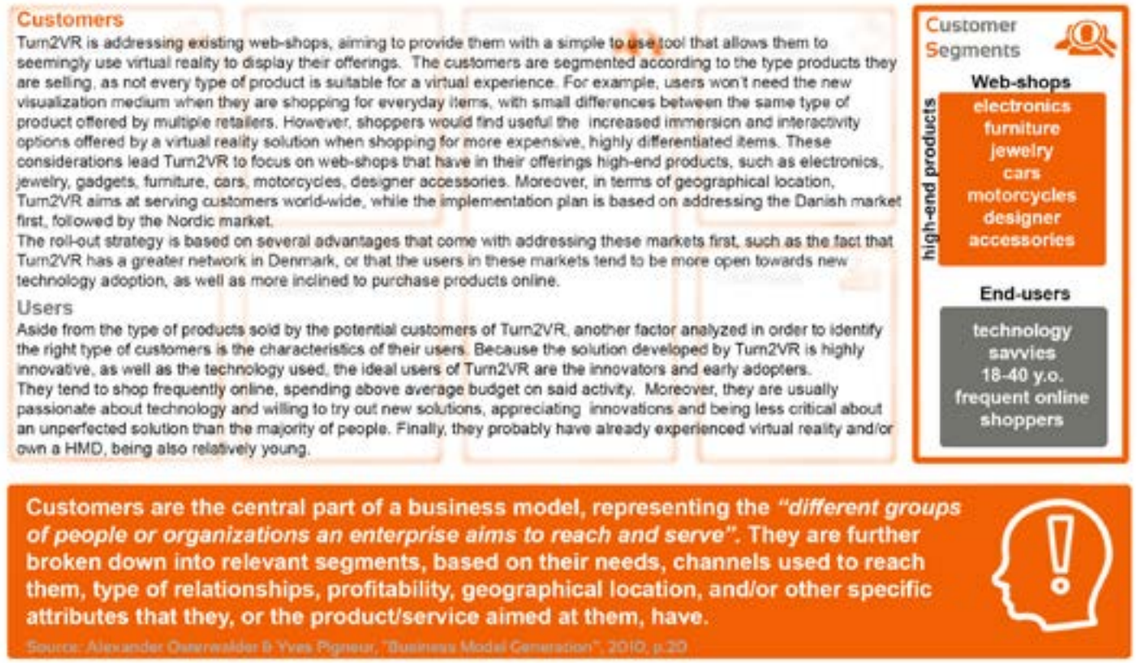



Figure 49 Customer Segments

## Value Proposition

In this building block, the company's offerings are examined and the most important benefits provided are highlighted. Here is important that the offerings are aligned with the customer's wants and needs, making the product/service more appealing.

Depending on the type of customer, value propositions can be formulated in different ways. If the company is addressing regular consumers, operating in a B2C market, it is common to see value propositions illustrated in a more personal style, with emphasis on the emotions and feelings determined by the use of the product/service. (e.g.: "secure", "user-friendly", "fast"). When the company is operating in the B2B market, the value proposition tends to have a more rigorous and number-oriented formulation, as in B2B the customers tend to be more rational in their purchase decisions, while in B2C customers tend to be influenced more by the emotional aspects.

Moreover, the value proposition(s) need to be transparent, as well as promoted on all channels, in order for the customers to have a clear understanding of the benefits of the company's products/services from the first moments when he comes in contact with the company, regardless of the channel.

Customer engagement is defined in C.M. Sashi's book as "creating deep connections with customers that drive purchase decisions, interaction, and participation, over time" (Sashi, 2012)

Customer engagement is important for a company, especially from the brand's perspective, with a brand being more valuable as it engages more customers, more often. Moreover, this is important in the long term, as maintaining the customers engaged can lead to an increase in brand loyalty, word of mouth and ultimately in number of customers and total sales generated.

Customer retention is one of the most valued metrics of a business, sometimes being almost synonym with the quality of the product/service. If a company manages to have a good customer retention rate, this can be seen as a sign of quality products/services, as happy customers return over and over to their favorite providers.



In the picture below, the Value Proposition block for Turn2VR is further addressed:


Figure 50 Value Proposition

## Channels

Like mentioned in the previous paragraph, the Value Proposition needs to be transparent and communicated through all the channels at the company's disposal.

A company can distinguish between own channels and partner channels, each one having different attributes. Usually, own channels have a higher margin, making them more attractive from a financial perspective. However, most of the times it is difficult to operate only through own channels, as sometimes the costs of setting up the channels are high. Moreover, resources spent on developing own channels can prove to be more efficiently used in other areas of the business. Using other existing channels can also allow the company to focus on its core business and scale faster, without having to worry about setting up and growing their own channel.

If a company uses a partner's channel, they can benefit from their partner's strengths and experience. On the other side, the margin is usually lower if a partner channel is used, making this option less attractive from a financial perspective. Moreover, the company doesn't have the same amount of control on the partner channel as on theirs, making it vital to have a good collaboration with the partner channel, as mistakes and miscommunications can lead to brand damage, a decrease in sales and other unwanted results. (Osterwalder et al., 2010)

In the picture below, the Channels for Turn2VR are further addressed:

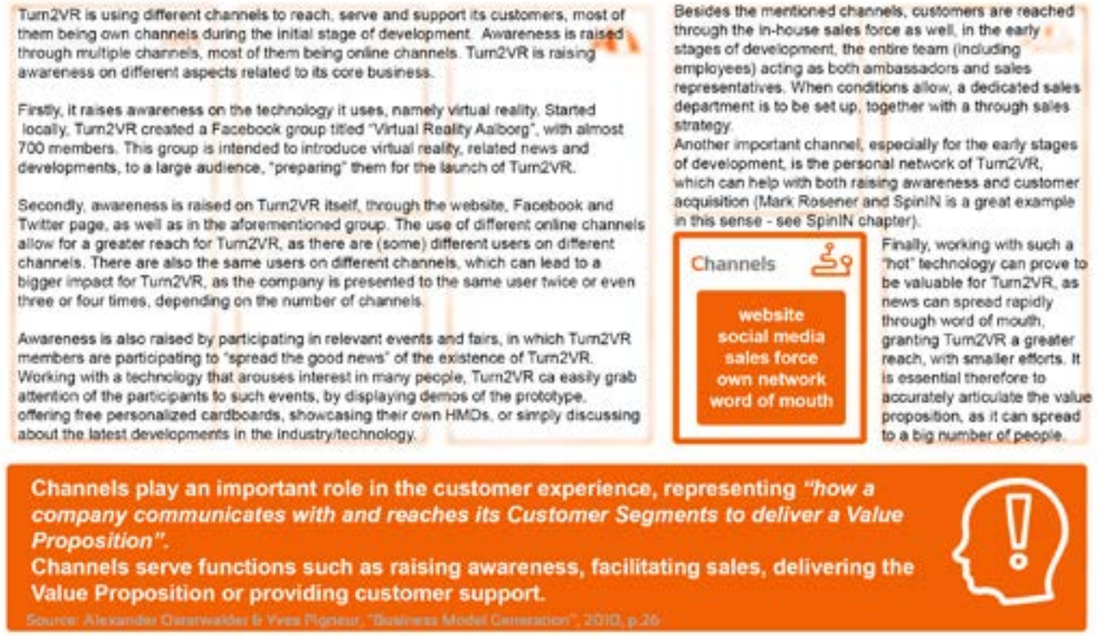



Figure 51 Channels

## Customer Relationships

The way that the relationships with customers are managed can have a great impact on multiple aspects of the business, ranging from how the business is perceived to how many sales are done and how satisfied the customers are with the provided solution(s).

In the current market conditions, it is increasingly important to have a good relationship with the customers, as they are becoming more and more selective when it comes to choosing their preferred provider.

Customer relationships range from automated services, where the business has little to no direct contact with the customer, to dedicated personal assistance, where the customer has a dedicated person handling his requests. The latest is usually found in businesses that have a really high margin, in this case, the costs of providing a dedicated person being way smaller than the revenue generated by one customer. (Osterwalder et al., 2010)

In the picture below, Customer Relationships for Turn2VR are further addressed:


Figure 52 Customer Relationships

## Revenue Streams

Revenues power the further development of a business, allowing for investments and product development if they exceed the costs by a large margin.

It is important to also distinguish from different revenue streams, as they can provide different returns, depending on the channel used. For example, a company that is selling their products only through their personal channels will have a higher profit margin, but can experience a smaller reach to customers. On the other hand, if a company is selling through a partner's channel, the profit margin ill most likely be smaller, as the partner will request some sort of payment for using its channel(s), but it will be able to reach more customers.

Moreover, a company usually has multiple packages (bundles) of products/services, and keeping track of the revenues that come from each one can also be a mechanism of testing different pricing strategies.

In the picture below, the Revenue Streams for Turn2VR are further addressed:

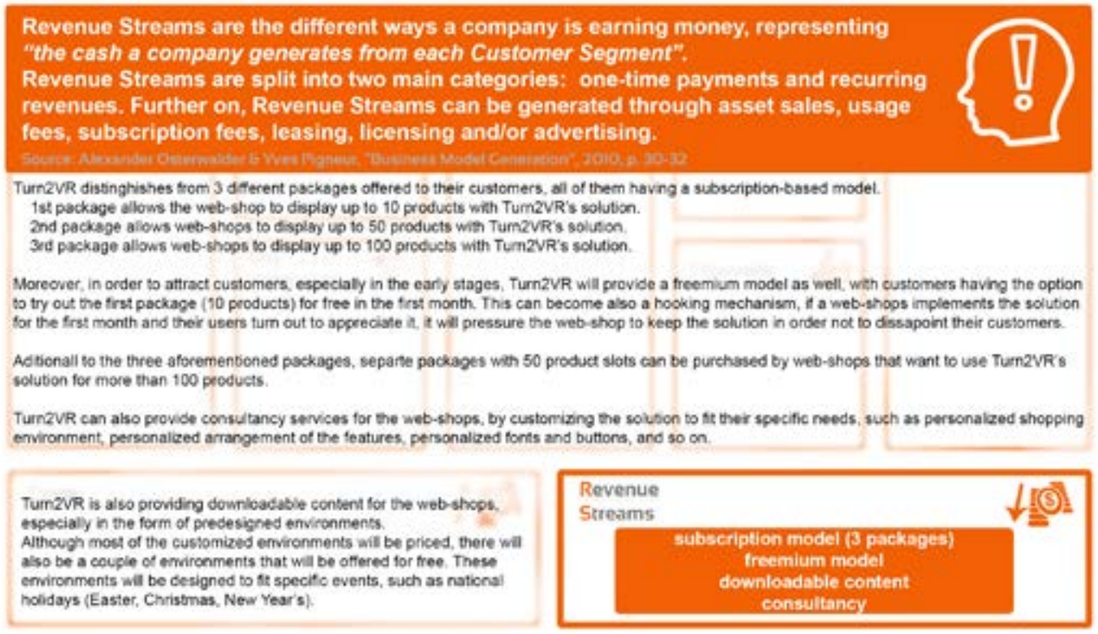



Figure 53 Revenue streams

## Key activities

A company has to perform a number of activities in order to fulfill its Value Proposition, reach its Customer Segments, maintain its Customer Relationships and drive the Revenue Streams. From all the activities performed by a company, there is a need to identify the ones that are most crucial, and without which the business cannot operate properly.

With the growth of the company, new activities will be introduced, some of them becoming key activities, while others being adjacent. Nonetheless, it is important to try to keep only the key activities in place where possible, as adjacent activities will drive costs up, as well as take from the time allocated to the key activities.

In the picture below, Key Activities for Turn2VR are further addressed:


Figure 54 Key activities

## Key Resources

In order to be able to deliver the Value Proposition(s) to the customers, a business needs a lot of resources to produce, market, sell and service their offerings. Some of these resources are indispensable in order for a business to run correctly, namely the Key Resources.

Key resources are situated within the operational field of the business, defining the type of materials needed, production facilities, equipment, human and financial resources.

For a variety of reasons, identifying the Key Resources is an essential process in a company. Knowing which resources are vital can help when the business is going through hard times when executives can make conscious decisions about what resources they can spare. Moreover, it is equally important to identify them correctly for the times when the business is growing at a fast pace. This will allow executives to make informed decisions on which resources they should acquire to keep a sustainable growth of the company.

SaaS (Software as a Service) is a “software licensing and delivery model in which software is licensed on a subscription basis and is centrally hosted” (Wikipedia, 2016). SaaS implies that there is no installation is needed by the customer, as he is able to access the full functionality of the service through the internet.

In the picture below, Key Resources for Turn2VR are further addressed:


Figure 55 Key resources

## Key Partners

Partnerships are preferred by many businesses operating today, due to the benefits that arise from cooperation with another entity. Benefits like cost savings, access to technology and knowledge, access to distribution channels weight greatly when deciding on partnering with another company.

This is seen even more in startups, which prefer to keep their focus on the core business and establish partnerships in order to deal with other aspects related to the business, which are not part of the core. Moreover, outsourcing has become increasingly appealing for startups, this form of partnership allowing them to grow at a faster rate by subcontracting other companies for development, sales, distribution, etc.

If decided on having a partnership, it becomes crucial to maintain a good relationship with the partner company/organization, as delivering on time and in good quality is important for a well-functioning business. This raises also concerns, if the type of partnerships established are vital for the business operations, as a faulty functioning partner can have a great impact on the business as a whole.

In the picture below, Key Partners for Turn2VR are further addressed:


Figure 56 Key Partners

## Cost Structure

In order to be able to deliver the Value Proposition, to maintain the Customer Relationships and finally, to earn revenues, a company has to cover various costs that occur during these processes.

For having a viable business, costs must be kept to a minimum, in order to allow an increase in profit, which can then be further reinvested in the development of the company.

Moreover, costs are important also when looking at the scalability potential of a business. If the costs increase at the same pace with the revenues when the customer database is increasing, the business will encounter difficulties when trying to scale. However, if the cost increases only by a fraction of the increase in revenue, it will allow the business to enter new markets, acquire more customers and scale to a larger extent than in the previously mentioned situation.

In the picture below, the Cost Structure of Turn2VR is further addressed:

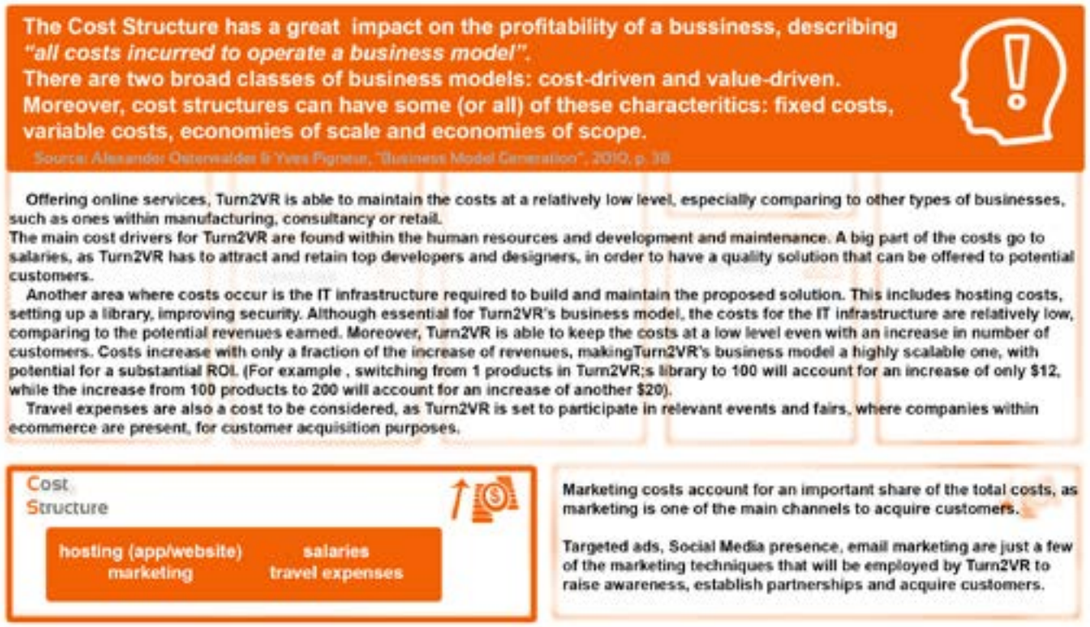



Figure 57 Cost structure

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# APPENDIX

# APPENDIX 1 : SCALABILITY

Startups and small businesses are two terms which are often used to describe similar types of business. However, there are some core differences between small businesses and scalable startups, the scalability being just one of them.

Steve Blank, a Silicon Valley serial-entrepreneur and academician, and the author of well-known and recognized bestseller, such as “The startup owner’s manual” and “The four steps to the epiphany”, describes 6 initial conditions that differentiate a scalable startup from a small business:

- Breadth of an entrepreneurs’ vision

Steve argues that having a broad vision, and not limiting to a specific area is one of the pillars of building a scalable startup. Moreover, giving the opportunity, the entrepreneurs should aim at building a new market, or even industry, where they can be uncontested leaders.

- Founders’ personal goals

Personal goals also play an important role when building a scalable startup. Instead of going for the quick cash, or a business developed enough to maintain the founders a good lifestyle, entrepreneurs often aim much higher and are willing to sacrifice a lot more to achieve their dream.

- Size of the target market

Another important characteristic of a scalable startup is the fact that the available target market is often huge, comparing t small businesses which aim at serving only a local market.

- Customer and Agile development to find the business model

A startup is able to scale only when a product-market fit is achieved, and the right business model is put in place. In order to have these characteristics, entrepreneurs make use of fast, agile methods to reduce risk and eliminate uncertainty.

- World-class founding team and initial employees



As the team is sometimes the most important asset of a startup, and has a great influence on the road the startup is taking, and ultimately, the success it can have, it is important that the founding team and initial employees are passionate and share the same vision, as this will move thing forward faster than expected.

- Passionate belief and a reality distortion field

Entrepreneurship is an area full of passionate people, with high hopes, big dreams, and the willingness to work to achieve these dreams. Considering that most of the startups fail (and every entrepreneur knows that), and sometimes the revenue is not enough, passion is the driving force that keeps entrepreneurs focused and engaged in their quest for building the best company in the world. (Steve Blank, 2016)

Like other terms that made their place in the business world, scalability has its roots in the IT industry, where is described as “the capability of a system, network, or process to handle a growing amount of work, or its potential to be enlarged in order to accommodate that growth”(Wikipedia, 2016)

Referring to startups, scalability lays in the potential of a business to accommodate an increased number of customers without having to invest heavily in the infrastructure.

If a startup can have an exponential increase in number of customers, and just an incremental increase in the costs associated with the growing number of customers, the business has a great scalability potential.

If the cost increase at the same pace as the number of customers, however, the business is hard to scale, as a great investment is usually required in order to accommodate more customers.

There are many factors that influence the scalability potential of a startup, and some of the most important ones are addressed in the present chapter. In order to assess the potential to scale, three main areas of a startup are analyzed:

- Concept scalability.

This section is reserved for an analysis on the concept itself, and its potential to grow

over time. The business model adopted is also considered, as well as the influences it has on the scalability potential.

- Organization scalability.

Many startups face major difficulties when they start to grow fast, mostly because the organization did not set up the conditions to accommodate the said growth. It becomes imperative to have a thorough analysis of the organization and prepare as much as possible for a rapid growth, as soon as possible.

- Economies of scale.

Arguably the most important characteristic of a scalable startup, financials have a great impact on the scalability potential. As mentioned before, if a startup is able to accommodate a high increase in number of customers without having to spend as much to do so, the scalability potential is high, and the startup can expect a rapid, but also sustainable growth.

## 11.1. Concept scalability

The mission of Turn2VR is simple: to allow online shoppers everywhere for a more satisfying, immersive and engaging shopping experience, with the use of virtual reality technology.

With the mission in mind, the developed concept follows the same line, in terms of simplicity, accessibility and “immersiveness”:

- it is simple to use (for both customers and users, with just the click - or “tap”- of a button, the product can be seen in the virtual environment);
- it is accessible to a large number of people (the pre-requirement is to have a smartphone and any type of HMD – event the cheapest ones, $5, can provide a satisfying experience);
- it is immersive, the users being able to have their own “sphere” where they can examine the products, by rotating, zooming in and out, and interacting with them ( e.g. : opening/closing a laptop, flying a drone, etc. ), all in a clean-looking environment and with quality sound accompanying them in their virtual space.

A couple of factors are analyzed further on, which influence the scalability of the concept:

- **Market**

In order to be able to accommodate a growing number of customers, it is important to have easy access to them, while the total available market has to be big enough to allow for expansion.

In Turn2VR’s case, the market in question is composed of online shops, especially the ones that sell products from the high-end class, with no geographical restrictions. This translated in the possibility for Turn2VR to enter any international market, with just minor changes needed to the solution provided (such as having the local language implemented in the app). Moreover, operating within e-commerce, Turn2VR can benefit from the constant growth seen in the industry, as trends show an increase in online shopping around the world.

With an increased demand for online shopping, the number of webshops is constantly growing as well, making the total available market for Turn2VR a consistent one.

- **Business model**

Turn2VR has opted for a business model that will allow the implementation in other markets, with no significant changes needed to the infrastructure, activities or resources. Moreover, Turn2VR has a subscription-based revenue model that brings benefits for both the company and its customers. For Turn2VR, the fixed subscription model allows for a standardized sales approach, refund system, and revenue projections, which translate in a reliable budget forecast. For customers, the subscription model provides clarity

and transparency, as there are no hidden costs and additional costs that may occur are only optional, the subscription including all the essential features for the implementation of Turn2VR's solution.

• **Way of delivery.**

Turn2VR has an exclusive online offering, the solution offered not including any physical products.

When the scalability potential is assessed, the companies that will have an easier time to scale are the ones that operate a "click-only" model, where the products are delivered through online channels.

Compared to "click-and-mortar", which use both online and offline channels, and "brick-and-mortar, which use only offline channels to make their offerings available, "click-only" companies will have to invest less in the supply chain and the sales channels.

• **Key technology/people.**

Turn2VR is developing a solution that is accessible to users that have access and knowledge of some of the most exciting technologies in the current times: virtual reality. However, Turn2VR is not developing physical products (such as HMDs), making the hardware technology less relevant to the development of the company's solution.

The technology does play an important role in the success of Turn2VR, as the number of people with access to virtual reality technology translates in the willingness of online shops to implement solutions that accommodate the said users.

If virtual reality gets accepted and used by the mass market, online shops will find themselves in a position in which incorporating the technology in their offerings is not only expected, but even demanded by their customers.

In terms of the technology needed for the development of the solution, Turn2VR is making use of simple hardware (laptops and HMDs) and software (Unity3D and 3D modeling software).

If the technology needed for the development of the solution is easily accessible and relatively cheap, the people using the said technology have a great impact on the outcome and its reliability.

For that, Turn2VR is employing highly skilled individual in a couple of essential areas, such as software development (two of the founders have educations and extensive experience within software development); branding and design (two of the members have education and experience with branding and design – both for web and other general purposes, such as business cards, flyers, social media, etc.); 3D design and animations (two of the members have education and experience in working with 3D design, Augmented Reality and Virtual Reality).

• **Cost of implementation in another market.**

With an infrastructure designed to accommodate a high number of customers, from any geographical location and that operate in any type of market, Turn2VR is experiencing low costs when entering a new market.

The main cost drivers for expanding to a new market are the hiring of local salespeople, investment in online marketing for the specific market and setting up a customer service tailored to accommodate the new clients. Depending on the characteristics of the market, the customer service can be accommodated by the existing infrastructure (especially if the clients in the new market are comfortable in using English as the communication language).

In terms of changes to the developed solution that need to be done when entering a new market, incorporating the local language is one of the essential requirements, other changes could be implemented, but not required.

After the analysis of different factors that can influence the scalability potential of Turn2VR's concept, a couple of key findings are presented: the total available market for Turn2VR is growing constantly, and is already big enough to allow for expansion; the current trends show an increase in interest towards the technology used and included in Turn2VR's offerings; the costs of delivering the developed solution are small, much lower comparing to other types of business; highly skilled individuals are required, but there

is an abundance of trained people in the key areas of Turn2VR, making it fairly easy to recruit personnel; costs of entering another market are low, making it inexpensive to try other markets.

## 11.2. Organization scalability

Like any scalable startup, Turn2VR is set to grow, fast and to a great extent. In order to do that, the right business model has to be set up, the right product has to be offered to the right customers and the right infrastructure has to be put in place.

When struggling to achieve the aforementioned fits, few startups focus on the ability of their organization to scale. However, most startups have an exponential growth, and when the right recipe is found, things start to move fast, leaving less time to focus on accommodating the highly increased number of customers.

Although Turn2VR is still in an incipient phase and needs to refine and test some of the characteristics of the provided solution, the team has seen a constant growth, currently having 9 people working on different areas. This leads to the need of implementing communication channels and project management tools, especially considering that most of the work is carried out remotely at the moment. In order to facilitate the communication between all the team members, company emails are created, and Slack is used as the preferred communication channel. Being a versatile tool, Slack offers different tools, such as Project Management (integration with Meistertask, a collaboration and task management tool, is easy); meetings scheduler (it integrates everybody's personal calendars, which makes it easy to find the right time for meetings); file sharing (files can be made available on different channels, and are easy to access by all members).

Project Management and internal communication channels are just two of the areas that have to be optimized in order to accommodate a growing number of employees and especially customers.

In order to address other areas as well, a model has been used by Turn2VR's team, namely Business Scalability Matrix. (Inflespoint, 2016)The matrix is developed by a consultancy company based in U.K., Inflex-point.



Although the matrix does not meet the academical requirements, it can prove to be a useful tool in Turn2VR's organizational development. Furthermore, the matrix has been used as a guideline for possible actions that Turn2VR needs to take in order to be ready for scaling, and more investigations will occur at a later stage of development. Nonetheless, the Turn2VR team considers that addressing some of the areas presented in the matrix from an early stage can prove to save a lot of time and efforts in the long run.

The matrix is composed of 10 factors, both internal and external, that address the scalability potential of an organization. Moreover, the matrix has the foundations in the Capability Maturity Model, a development model created by Carnegie Mellon University (CMU) that is originally aimed at improving the existing software development processes. (Wikipedia, 2016). The matrix puts also an emphasis on B2B companies, making it a suitable choice for Turn2VR, which operates in the same conditions.

The 10 factors analyzed are ranked from 1 to 5, 1 being the least suitable for a scalable company, while scoring 5 means that the company has well covered that specific area and is ready to scale without encountering major issues. An overview of the matrix can be seen in the picture below.

***I. Clarity of market focus***

According to this criteria, a company can fall in one of the following categories:

1. Reactive

The company is willing to sell to anybody interested in their offerings, without having a clear market segmentation or focused marketing efforts towards a specific customer segment.

2. Demographic

The company is considering different customer segments and has tailored approaches to them; the segmentation is done according to traditional factors (age, location, industry, etc.)

***3. Firmographic***

Other factors are considered as well when segmenting the customers, besides the traditional demographic ones; structural, environmental and behavioral factors are also taken into account.

The market segmentation of Turn2VR take into account the demographic factors (in terms of location, the focus is put on Denmark, the Nordic countries, and Europe, in that order; in terms of industry, Turn2VR is focusing on online shops selling consumer goods), as well as other factors, such as the type of products sold on the webshop.

In order to be considered relevant for Turn2VR, a webshop has to sell consumer goods, and these goods need to be situated in the high-end spectrum.

Moreover, products that involve a complex buying behavior are more suitable for benefiting of Turn2VR's solution, as well as products that have a high degree of details and are highly differentiated from products in the similar category, or which serve similar purposes.

4. Focus on stakeholders

The customer segmentation includes detailed profiles of key stakeholders who are likely to be involved to a large extent in the buying process.

5. Ideal customer

Companies that have an established process aimed at disqualifying irrelevant customers and focusing on the ones that have the most characteristics of the "ideal customer".



***II. Repeatability of solutions***

Being able to replicate the solution in different markets without having to make fundamental changes is a pre-requisite of having a scalable business, as the ultimate goal is to have as many of the processes automated, in order for the business to be able to run with as low input as possible.

According to this criteria, there are five types of solutions, as follows:

1. Random

The solution is usually tailored to every customer, and there is little standardization. Although it might employ some standard procedures, the end results are usually tailored to the specific customer, increasing the time and efforts needed to deliver the solution. Relevant examples can be seen in the case of handmade products or consultancy companies.

2. Common Components

The solution is seeing a higher degree of standardization, with a number of components being used repeatedly to answer the customer's needs. However, there is still a high degree of uniqueness in the end result, and the solution varies from customer to customer.

3. Standardized

The company has developed a standardized product or service which is sold in a repeatable, consistent way. However, the revenue generated by the standardized product or service accounts for only a minority of the total revenue, the rest being generated by the sale of differentiated solutions.

***4. Replicable***

The majority of the revenues come from clearly defined, standardized product and service offerings which are also marketed and sold in a consistent way, through the same type of channels and addressing similar types of customers.

Turn2VR has three main revenue streams, with one of them generating the majority of revenues. The three revenue streams are as follows:

- Subscriptions. The basic functionality of Turn2VR is offered in three main packages, based on the number of products that the customer is able to display in a virtual environment. The solution sold through these packages is highly repeatable and standardized, with no differences between them except the capacity offered. The subscription accounts also for the majority of the income generated, as it is the main offering of Turn2VR and can be sold to different customer segments without alterations.

- Downloadable content. This revenue stream consists of differentiated environments (most of them with specific themes, such as holiday-related: Christmas, Easter, New Year or industry-related: electronics, furniture, etc.), as well as of additional product slots (50).

- Consultancy. The third revenue stream consists of consultancy services for customers, aimed at creating and delivering a highly personalized solution, which can include personalized environment(s), as well as personalized functions, arrangement of features, etc.

5. Highly repeatable

More than 90% of the revenues and profits come from clearly defined, standardized product and service offerings sold in a consistent way.

### *III. Market differentiation*

Although the competition is not as fierce as in other markets, there is still a need for differentiating between Turn2VR's solution and the competitors', as the differentiation can prove to be more appealing to specific customer segments.

According to the level of differentiation on the market, the solution provided by a company can be:



1. Undifferentiated

Customers have a hard time to differentiate between the company's offerings and the one that competitors are providing. This is usually seen in highly competitive markets, where numerous companies compete for the same customers.

2. Somewhat Better

The company claims to be better than the competitors, but there are few proofs to sustain the claim. Moreover, customers don't usually see the differences between the competitors, unless they are pointed out specifically.

3. Probably Better

The company claims to be better than the competitors and clearly articulates the proofs that sustain their claims. Moreover, customers identify and appreciate the differences easily.

***4. Distinctively better***

The company is clearly articulating the differentiation points and shows how these translate into added value for the customers. Moreover, customers appreciate the differentiations and opt for the increased value provided.

Turn2VR is offering a solution that is different from the competitors', and which translate into clearly defined benefits for the customers.

Firstly, Turn2VR is providing a solution that can reach a higher number of users as the needed technology is simple, accessible and easy: any smartphone coupled with any HMD can run Turn2VR's solution.

Secondly, Turn2VR is providing a solution that is linking the existing channel of the webshop with the new, virtual channel, making the solution easy to integrate into the current offerings of the customers. (See chapter xx for more relevant information)

Thirdly, Turn2VR is providing a simpler, much cleaner solution, where customers can easily navigate through products and categories, being always in control of what is displayed

in front of them.

5. Truly Unique

The company constantly positions itself in a way that is unique, provable, highly relevant and hard to claim by any competitor.

### *IV. Offering focus*

Having differentiation points is a great benefit for any business operating in a competitive market. However, these differentiation points have to be clearly articulated in order to have the desired outcome, through the marketing and selling efforts.

Considering the focus of the marketing efforts, a company can fall in one of the following five categories.

1. Feature Focused

The marketing efforts of the company revolve around the specifications/ features of the product or service offering.

2. Advantages Focused

The emphasis is put on specifications/features again, only this time in comparison to competitors.

3. Benefits Focused

The focus is on the solution provided and the superior benefits of said solution compared to competitors.

4. Solution Focused

The product or service offering is marketed with a focus on business issues and problems the company's solution is addressing.



***5. Outcome Focused***

The main focus is put on the outcomes that the customer is expected to achieve when implementing the company's solution.

The marketing efforts of Turn2VR are aimed at highlighting the outcomes that the customers can expect. One of the first outcomes that come from the implementation of Turn2VR's solution is the increase in marketing and PR that a customer can expect. Working with a booming technology (virtual reality), any customer opting for Turn2VR's solution will position itself as highly innovative, aware of the market trends. Moreover, if the customer is opting for having an implementation plan that includes offering for free personalized cardboards (from Turn2VR's supplier, or a different one), the marketing reach is even higher.

Although not tested yet, Turn2VR aims to provide a solution that will translate in an increase in customer engagement, acquisition and retention and that will help lower the product return rate as well. These benefits are to be tested within the first pilot test.

### *V. Marketing focus*

Marketing efforts can be directed towards inbound marketing, outbound marketing, or a combination of the two. Considering where the focus is put, a company can be considered to have its marketing focus on one of the following five categories:

1. Mostly outbound

The majority of the marketing budget is focused on traditional outbound activities (mailing, adverts, etc.)

***2. Experimenting with inbound***

Traditional outbound techniques are complemented by inbound techniques, such as SEO.

Although inbound techniques are the main focus of Turn2VR at the current time, work is

being carried out in terms of Search Engine Optimization. Moreover, on the social media side, Turn2VR is currently working on an effective LinkedIn strategy, which is expected to have a higher conversion rate than other medias. The marketing efforts are expected to shift to mostly inbound after enough inbound activities are performed and Turn2VR is leveraging the partnerships available (especially the partnership with Nordjyske Media, which is expected to provide benefits in terms of PR)

3. In transition

The resources are evenly distributed among inbound and outbound marketing activities.

4. Mostly inbound

The majority of the marketing efforts are focused on creating a constant stream of inbound enquiries.

5. Socially integrated

In addition to the focus on inbound marketing, the entire organization is leveraging business social media.

### *VI. Sales Process*

An effective sales strategy is reflected across the organization and has a high emphasis on constant learning and sharing of new learning across divisions of the company. According to the strategy adopted towards sales, the process can be defined as:

1. Random process

There is no standardized sales process and salespeople have their own individual way of dealing with the process.

***2. Informal process***

A sales process is sketched, but the company does not enforce its use by the sales people.



Because of the early stage in which Turn2VR is currently situated in, a sales process is sketched out, but individual sales people still have their own approaches to making the sale. This can pose as a benefit, considering the early stage of Turn2VR, as different approaches can be tested until a suitable, highest performing one is found. The whole sales process is following the Lean Methodology as well, aiming at identifying the characteristics that perform the best in the shortest period of time as possible.

3. Formal process

The company enforces the use of a defined sales process and systematically measures and monitors its adoption by sales people.

4. Embedded process

The sales process is enforced, measured and deeply integrated into your CRM (Customer Relationship Management) system and day to day reporting activities.

5. Agile process

The company has agile and dynamic sales and marketing process that is continuously refined to reflect new learnings and changing market conditions.

### *VII. Customer focus*

The ability to understand, adapt to and even foresee how the customer buying process is evolving over time can prove to shorten the sales cycle, increase the conversion rate and generally make the whole sales process easier to be carried out, with better results. After assessing the degree in which the company is taking into account the customer buying process, the sales process can be considered:

***1. Sales Centric***

The focus is on the sales persons and the actions that they are expected to undertake.

Within the short period since its inception, Turn2VR has focused on different areas of the startup, ones that in the team member's view have a greater impact on the immediate

success of the company. Following the Lean Methodology, Turn2VR is firstly aiming at developing a solution that can be easily sold to any prospective buyer, because of the clearly articulated value propositions. Although the customers of Turn2VR were analyzed and considered when developing the solution, few efforts were directed at mapping out the buying process of prospective customers.

Nonetheless, a thorough analysis of key stakeholders and the buying process, including key milestones, motivations, and concerns, is to be carried out in the next phase of development of Turn2VR.

2. Buyer-Aware Milestones

The milestones of the progress between different stages in the sales process are based on buyer behavior.

3. Buyer-Aware Process

Each stage in the process is carefully aligned with the equivalent phase in the prospect's buying decision process.

4. Buyer Aligned Process

The sales process anticipates and addresses the issues, concerns and motivations of each key stakeholder at each stage of their buying decision process.

5. Buyer-Centric

Each phase of the customer's buying decision process is facilitated and accelerated by specifically designed sales process.

### *VIII. CRM Adoption*

Customer Relationship Management systems allow companies to manage the sales process, as well as the business relationships and the relevant data linked to them. Although a powerful tool for any business, there are differences considering to what extent this system is adopted.



1. No CRM

There is no integrated CRM solution within the company.

***2. Basic CRM***

A CRM solution is integrated within the company, but only default settings and features are used, without any customization.

Some of the team members of Turn2VR have been working closely with CRM systems in the past, making it a preferred way of dealing with sales, as well as business relationships. However, giving the stage in which Turn2VR is currently found, a proper integration of CRM systems is still to occur, as the company will shift the focus from solution building and partnership acquisition to sales and partnership building activities.

3. Widespread CRM

The CRM system is customized to meet the company's needs and is actively used by the sales team.

4. Enthusiastic adoption

The CRM system is widely spread and enthusiastically adopted by both sales and marketing teams.

5. Revenue Cycle Management

The CRM system reflects the entire sales process and brings all activities together into an integrated revenue cycle.

### *IX. Sales-Marketing integration*

1. No alignment

The two departments, Sales and Marketing are running independently, with little collaboration between them.

2. Grudging cooperation

Sales and Marketing are able to work together on an ad-hoc basis, do not have a long-term collaboration plan implemented.

3. Aligned

The objectives and activities of both teams are aligned and there is a strong sense of respect and collaboration.

***4. Shared Plans***

The two departments work closely together and plan the activities accordingly.

Although until the moment when the report was written, the number of sales activities were rather low, all the activities within the team have had a high degree of transparency and collaboration. Even from the inception of the company, the aim of the founders was to create a transparent environment, where all the members will be aware of the current progress and will participate actively in different areas of the business. The strong collaboration is currently seen between the software development and 3D design teams, as they are working closely together to implement the changes that occur and to finalize the product. This type of collaboration is expected and required between the sales and marketing teams as well, as they are indispensable to each other.

5. Fully integrated

The company's sales and marketing activities are fully aligned and integrated, with shared objectives, goals, metrics and compensation plans.

## *X. Customer relationship*

Buyer-seller relationships can range from strictly commercial ones to strategic partnerships, depending on the type of benefits a stronger collaboration between the two can provide. Considering the way a customer sees the relationship with their provider, a company can fall in one of the following five categories:

1. Approved Vendor

The customers see the company as a good solution provider but see little to no differentiation between the company and its competitors.

2. Preferred supplier

Based on its reputation, most customers see the company as the preferred vendor of the solution provided.

3. Solutions Consultant

Besides seeing the company as the preferred vendor, customers perceive it as a complete solution to their needs.

***4. Strategic Contributor***

The customers see the company as a source of strategic insights in the challenges faced.

Turn2VR can provide more than just the direct advantages of the solution provided. On top of the already mentioned value propositions, another way how Turn2VR can help their customers to solve other issues they might face is through the data that Turn2VR has access to. Being able to analyze the collected data, both customer data, and interaction data, can help improve not only Turn2VR's solution but also the web shop's practices and strategies.

5. Trusted Partner

The company is seen as a long-term partner, which is vital to the customer's long term success.

## 11.3. Economies of scale

One of the main drivers of scalability is the report between operating costs and operating income, and especially how this report evolves over time. In order to be considered financially scalable, a business has to maintain the costs at a low level, even if the number of customers is increasing.

For Turn2VR, the main costs drivers are found in the salaries paid to the employees, the marketing activities and the operating IT costs.

For the first financial year, according to the shareholders agreement, salaries will not be paid, the income being reinvested in the business instead, in order to reach a minimum cash pool that will allow further expansion and payment of salaries to all employees.

The marketing costs will be also kept to a minimum in the first financial year, leveraging the available resources, in terms of partnerships and soft grants.

The operating IT costs are calculated according to the number of products that are hosted and displayed through Turn2VR's app. The operating costs increase with the number of clients serviced, but the increase is incremental, with the increment having a low value, the difference between hosting 10 products and 770 products (the forecasted value for the end of the first year) is of only DKK 5000.

With the operating costs increasing at a slow pace, as well as the marketing budget, for the first financial year, a report between operating income and operating costs is favorable for allowing scalability.

In the picture bellow, the operating income and the operating costs are presented, as well as their evolution throughout the first year. It is important to note that the taxes are also included in the operating costs.

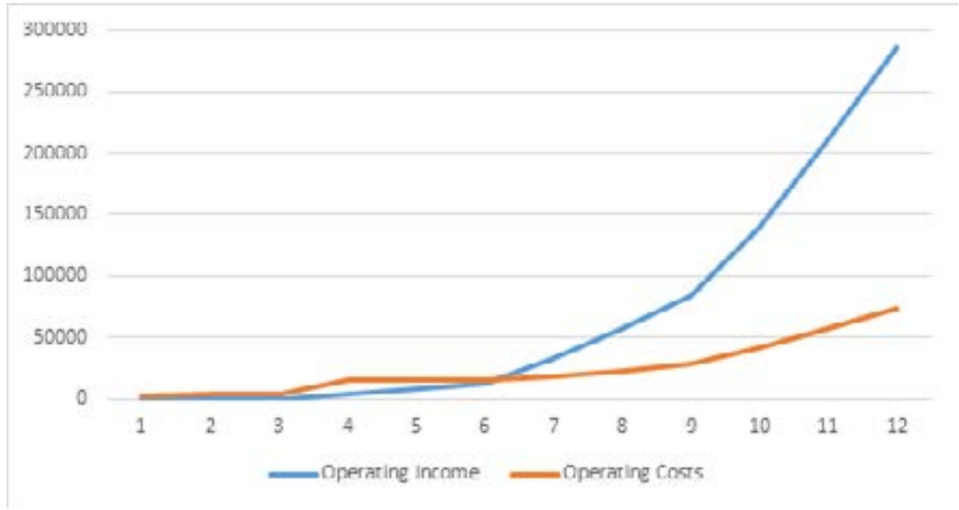



Figure 58 Income vs costs

# APPENDIX 2 : SOCIAL MEDIA ANALYSIS

Social media analysis has become an important part of understanding consumers 'behavior, thoughts and ideas. Social media is one of the first drivers of the customer insights and feedback: the shift towards a space in which customers expect startups and established companies to respond to their wants, needs, and complaints (Critical, 2016). Consequently, the vast majority of social media users remain silent online which means that the clusters that create, give and require content, offer a very limited picture of today's customers (Critical, 2016).

Companies that conduct their leads or marketing strategy based on social media input face a very real risk of misunderstanding their future or existing customers and their market (Critical, 2016). To increase awareness, the team behind Turn2VR started both an online community on Facebook, called Virtual Reality Aalborg and a dedicated Facebook page for Turn2VR.

The marketing campaign began in February 2016 while managing to raise over 600 followers on the Virtual Reality group. The community gathered within the Virtual Reality group is very active, posting daily news about the technology and engaging in conversation. The team started the group with the aim of creating awareness of the technology and develop a market to co-create with. The first co-creation workshop developed by Turn2VR was shared on the Virtual Reality group, managing to raise interest from over 32 people, from which 14 people attended the workshop.


Figure 59 Virtual Reality Aalborg Facebook group



Based on the learning outcome of other social media campaigns executed by the team, a dedicated Facebook page was created, which gathered close to 50 likes during its first week of activity.


Figure 60 Turn2VR Facebook

This made it possible to engage with a small but relevant audience, which would eventually give the possibility for Turn2VR to communicate the concept with customers and end users from the Nordic countries. The campaign made more individuals aware about the concept and also led people to explore the technology, and it is potential.

If a company uses social media as one of its customer listening posts, it is crucial to understand what they are hearing and what they are missing (Critical, 2016). That means recognizing that "social media users" are not a monolithic group. In other words, people use social in very different ways. For that reason, the team behind Turn2VR have researched a number of criterias to distinguish between three types of social media users.

- "Lurkers – Individuals that post once a week or less
- Dabblers – Individuals that post two to four times a week
- Enthusiasts – Individuals that post several times a week, including links, photos & videos" (Critical, 2016)

Once a startup company looks into social media with these three types of users in mind, they can see that most of their social media audience is virtually invisible and the data acquired for social media analysis is mostly gathered from the last type of social media user, namely 'Enthusiast (Critical, 2016).'

To get an understanding of the company's social media traction, the team makes use of tools for social media monitoring (Critical, 2016). In Turn2VR, the team makes use of analytic tools such as Buffer. Buffer is a social media planning tool that allows the user to schedule a post on all existing social platforms. Moreover, Buffer allows startup companies to create a free account and use it with only two social media profiles. This technique brought them an increase in usage, and when a startup starts earning money, they are already used with the comprehensive tools and metrics, that Buffer provides, leading them into sticking with Buffer.

In time, startup companies that only analyze data coming from enthusiasts user, miss the contact with more than 60 percent of their audience. This creates a critical problem for startups that aim to engage with their customers through social media (Critical, 2016). Listening to enthusiasts gives startups an unrepresentative picture of their clients as a whole for three reasons: analytics tools do not reflect what happens in social media, social media users do not reflect their customers and enthusiasts do not reflect the entire social media audience (Critical, 2016).

While "enthusiasts make up 30% of the social media audience, more than half of what startups see on social comes from an even thinner slice" (Critical, 2016). Turn2VR makes use of the terminology "super-enthusiasts" and they represent the 8% of social media users who post more than twice a day (Critical, 2016).

In 2006, Jakob Nielsen "summarized this as the 90-9-1 rule: 90% of online community members are silent, 9% participate occasionally, and 1% participate actively" (Critical, 2016). While the rise of social media means that almost 30% of users now post regularly, the underlying problem remains: the vast majority of what startups see online comes from an unrepresentative portion of their customers. (Critical, 2016).Moreover, "because super-enthusiasts post so frequently, they distort startups social media analytics even further—more than half of what startups hear on social comes from less than 15% of their social media audience" (Critical, 2016).

Consequently, the team launched a Twitter page that managed to acquire over 300 followers since its inception. Followers usually come as people who wish to connect and find out more about a brand, in this case, Turn2VRs application (Lee, 2015). The benefits of followers are for the reach of Turn2VRs content, the social proof of Turn2VRs brands popularity and vanity metrics (Lee, 2015).

Figure 61 Turn2VR Facebook insights

Another approached use by the team was to retweet relevant news coming from influencers on the field of virtual reality. The approach allowed Turn2VR to increase the reach that the content shared had, and the startup is perceived as potentially interesting to one's followers (Critical, 2016). The benefits of retweets are for advanced exposure to people who are not necessarily followers and social proof that Turn2VR knows how to distribute news and relevant content on social media (Critical, 2016).

For Turn2VR to increase it reaches on Twitter, which translates as the cumulative number of followers summed with the retweets for a single tweet, the team made use of tools such as Hootsuite. Hootsuite is a social media planning tool that offers their customer the possibility to follow highly rated Twitter accounts and influencers. This means that startup companies could get access to many followers if the content they produce is shared by people with influence in the field they activate.

To measure the engagement, which is the number of interactions the post or tweet had, Turn2VR had reached with each of its posts more than 2500 twitter users and influencers, from which 45 percent have engaged with the post. Due to the high amount of post and relevant content, several post of Turn2VR were shared by Oculus Rift founder and HTC Vive developers. That allowed for 10 percent of the tweets displayed for one week to be visualized by more than 15000 twitter users.  Considering that Turn2VR only had 65 followers at that moment, in the next two weeks TurnVR's Twitter page reached more than 300 followers, and that happened because influencers shared Turn2VR's content. Content marketing is a marketing technique of creating and sharing valuable, relevant and consistent content to attract and acquire a targeted audience while having the objective of driving profitable customer action (Critical, 2016).

After reaching out to the client through channels as Facebook andTwitter the next approach for Turn2VR is to expand its marketing content on LinkedIn. LinkedIn has grown from its incipient to a user base of 259 million, at it is perfectly aligned for B2B lead generation (Buscemi, 2015). Since Turn2VR activates in the B2B sector, starting a marketing campaign on LinkedIn would be indicated, as the majority of business are particularly active on LinkedIn. At the moment, the marketing strategy is executed by the founders but as the team increases, the founders will ensure that there will be dedicated and responsible people for each of the channels Turn2VR makes use of to reach its audience.

A landing page is a nothing more than a web page that allows a startup to capture a visitor's information through a lead form (Trail, 2011). A good landing page will target a particular audience, such as traffic from an email campaign promoting a particular ebook, or visitors who click on a pay-per-click ad promoting a webinar (Trail, 2011). Therefore, it's important to build a unique landing page for each of the offers a startup is creating (Trail, 2011). A startup can build landing pages that allow visitors to download the content that is offered as for example e-books, whitepapers, webinars, or sign up for offers like free trials or demos of a startup's product (Trail, 2011). In Turn2VR, the landing page is designed to allow the team to target a respective audience by offering them something of value, in this case, a trial of the application and convert a higher percentage of the visitors into leads (Trail, 2011).

A good technique that would conduct to improving the marketing efforts of Turn2VR and the return of investment would be to have landing pages for all the actions a startup requires the user do to when reaching its website.

Again, the majority of companies use communication forms, such as e-mail, social media, and search traffic to their existing web pages (Trail, 2011). The particular strategy has its flaws, as the majority of the leads are basically thrown away. In order to capture those leads at a much higher rate, a startup needs to direct the user to a targeted landing page.

Turn2VR has adopted the approach named as KIS (Keep it Simple) for making the user take the call to action, which in Turn2VR's case would be either to try the application demo, refer a friend or sign up for a 10 days trial.  Consistently, by having the user experience and call to action comprehensible, the user needs to understand the concept and call to action in the first 30 seconds after reaching Turn2VR's landing page.

# APENDIX 3: SECOND WORKSHOP

The first co-creation workshop conducted by Turn2VR had its emphasis on exploring possible features that the solution should include, as well as their placement within the app. Moreover, the workshop explored also a couple of essential areas, such as buying behavior of online shopper or the potential of virtual reality (both within the industry and outside it).

The first workshop was designed and run by the Turn2VR team, based on the research done on conducting co-creation workshops, as well as on the outcomes that the team was expecting from the exercise.

For the second workshop, the team set to look deeply into the interaction possibilities, to gather feedback on the existing prototype and to spark discussion around the solution and the possible directions it could follow.

Turn2VR team does not have extensive knowledge or experience in conducting workshops, which was considered as a limitation, having the potential to make the outcomes bias. In order to avoid similar limitations for the second workshop, Turn2VR has partnered with a MSc. Student from Aalborg University, who was writing his master thesis on topics related to the facilitation of workshops and their impact on the development of given companies.  The student, Carlos R. Fonseca, is set to graduate from MSc. Information Architecture and UX design at Aalborg University, and the workshop conducted with Turn2VR is also documented and included in his thesis.

Choosing to have an external facilitator for the workshop had both cons and pros. To start with, the external facilitator had a good influence on the structure and development of the workshop, as previous knowledge and experience proved to have a great impact.

However, there was one important challenge, which was observed only during the workshop. The facilitator and Turn2VR representatives have planned the workshop for a couple of weeks prior to the execution, and by the time when the workshop was conducted, all the involved parties had a great understanding of virtual reality technology and the proposed solution of Turn2VR. This lead to the bias of considering that the participants to the workshop have a similar understanding of virtual reality, which proved to be wrong.

Nonetheless, the workshop provided a couple of key interesting insights, from the users' point of view, which will be considered in the further development of the solution.

Overall, the workshop failed to meet the expectations, mostly because of the challenges presented before. Because the workshop participants were not fully aware of how virtual reality works and how interactions could occur in the environment, there were a few suggestions for interaction which were not possible (for example a suggestion was to use the touchscreen and the interaction with it – pinch, stretch, etc. – which is not possible while using a HMD).

### Constraining effects of examples in creativity

Research concerned with creative cognition and creative idea generation carried out by Steven Smith, Thomas Ward and Jay Schumacher (1993: p.844) found that there is an effect of conformity when participants of experiments of creative generation task were shown examples of previous work, the outcome designs were more likely to contain features of the examples they were given before the tasks.

Smith, Ward and Schumacher express that even when the participants were asked not to conform to the examples, and create items different from them, conformity did not decreased. The researchers argue that this conformity might be caused by unintentional memory retain of the examples. They concluded that introducing examples can constrain creative generation of imaginative ideas, when compare with a control group to whom examples were not introduce.

Smith, Ward and Schumacher note that their results were consistent with previous observations made by Ward that exemplar generation can be influenced by subject's self-generated examples. The results were also consistent with research that shows a self-generated interference output caused by initial retrieval in free recall studies made by Henry Roediger and James Neely, and conclude that whether items are initially retrieved from memory, or given as examples, they inhibit retrieval of other related information (Smith, Ward and Schumacher, 1993: pp.844-845).

Moreover, Smith, Ward and Schumacher add that studies carried out by David Jansson and Steven Smith with engineering students and professional designers also showed this conformity in experiments where the subjects were shown examples prior to design tasks, even when the examples contained unsuitable features for the task. Another consequence found in those experiments, the researchers explain, is that when examples given missed an important feature, it was also likely that the feature was omitted from the resulting designs.

## The Creative Platform

The Creative Platform process was developed at Aalborg University, as part of the work carried out by the Research Group for Unlimited Knowledge Application . The process is heavily focus towards the education system, but with applications in different facets of work life, as described in the book "The Creative Platform: A Handbook in Creative Processes for Education and Worklife" (Byrge, C. and Hansen, S. 2015: Introduction).

Byrge and Hansen explain (2014: 7. The creative process) that the purpose of the Creative Platform is to facilitate creativity by bringing the share knowledge of the participants into play in relation to a task. The creative platform is used when a group of people has a task that they want to solve outside of their standard routines, biases and expectations.



The Creative Platform promotes implementing four basic principles throughout the process (Byrge and Hansen, 2015: The Foundation of the Creative Platform):

1. Horizontal thinking: stimulation to think an act across patterns
2. No experienced judgment: to feel free in thinking and communication
3. Task focus: focus remains on the task at all times
4. Parallel thinking: everyone has the same focus at all times

The process follows these phases (Byrge and Hansen, 2015: The 3D Pedagogy):

1. The preparation includes planning in detail all the subtasks, the combination of participants, the physical environment, and a detailed program for the process.

2. The Red Carpet is a ritual that consists of a series of 3D cases in which the participants are led up on the Creative Platform.

3. The task is presented very briefly and without any professional input of any kind, precise and maximum 5 minutes in total.

4. Unlimited use of knowledge. It normally starts with individual idea generation followed by group idea generation. After this, individual and in groups selection of ideas and also further development of ideas.

5. Subject knowledge is brought into the process through different strategies in order to make professional further development on original ideas.

6. The Blue Carpet is a ritual in which participants are taken down from The Creative Platform.

Byrge and Hansen (2014: 7. The creative process) argue that the creative platform differs from other creative process models because of its focus on the application of knowledge and use of 3D cases to increase creativity throughout the process.

## Turn2VR workshop

The company arranged a venue for the workshop, an event's space in a building owned by Aalborg Municipality where International House North Denmark, as well as other organizations and startups are located. The facilitator was responsible for getting participants for the workshop.

People were invited by the company. There were five participants. The workshop took place on April 28th at 2:00 pm, and took around 3 hours.

This workshop was intended to test the Creative Platform under certain circumstances such as presenting prototypes of the Turn2VR product. It was designed following the example modules of the process available at the Research Group for Unlimited Knowledge Application's Website , and taking into consideration the learning process of previous experiments with the Creative Platform.

The module examples layout the six phases of the Creative Platform (Byrge and Hansen, 2015: The 3D Pedagogy):

1. The preparation. This phase was done prior to the facilitation of the workshops and included the research phase of the development of Information Architecture as well as preparing the workshops.

2. The Red Carpet. A series of 3D cases.

3. The task presentation. Done by someone from Turn2VR's programming team

4. Unlimited use of knowledge. Individual idea generation, individual selection of ideas.

5. Subject knowledge for further development on original ideas. This included the creation of group rough wireframes and sketches. Followed by an opportunity to ask others on their ideas about the idea and sketches. Finalizing with an opportunity to include some of the ideas received into the rough wireframes.

6. The Blue Carpet. Group presentation of one unified wireframe to the company. Questions by the company about the ideas presented by the participants. Followed by a reflection on the creative process.

The documents, materials and tools chosen for the process were gathered and printed beforehand  and included 3D case instruction cards, word, picture and person-analogy stimuli training cards. An empty space for sketching with a border resembling a mobile phone was also printed.


Figure 1. From left: Person-Analogy, Picture and Word stimuli training cards. http://www.uka.aau.dk/The+Creative+Platform/Process+tools/

## Layout of the workshop

Turn2VR programmer participated in all the 3D cases where the group was divided in pairs, since there were five participants.

Red carpet. First, some ground rules and organization matters of the process were established and explained. Important mention to the "No phones and No watches" rule, as well as writing down on a post-it anything the participants thought about that was not related to the task at hand and put it aside. Then a series of three 3D cases followed with the objective to build up the participant's confidence, concentration, and motivation. (Byrge and Hansen, 2015: The 3D Pedagogy). The 3D cases chosen followed the 3D case standard layout .The 3D cases introduced were:

o Making mistakes. The 3D cases on Accept Making Mistakes were developed to train the language, body, and attitude of the participants to make mistakes. The exercises consist of making mistakes, accept and celebrate them. Two exercises were given: the first one just to produce a lot of mistakes to get use to the idea of making mistakes and the second one asking the participants to say out loud "Yes, I made a mistake".

o Finding principles. This 3D cases train horizontal thinking and improve the participants' to access knowledge from different parts of their mental libraries.

The first two 3D cases took around 3 minutes each with instructions and performance. The third exercise was individual and was divided in three parts, taking 10 minutes in total. The participants were asked to take a sit.

**Task and problem presentation.**

The task had been previously drafted and then agreed with Turn2VR. Once the participants were sitting, a programmer from Turn2VR came in the room to present the following problem:

***"Turn2VR needs your help as potential users of their solution to develop on the design they have been working on. How would the solution look like? How would the user navigate and access its functionalities?"***

Following the problem presentation, a demo of the prototype of Turn2VR product was showcased from a Smartphone through a computer.

During the presentation, and in different phases of the workshop, it was highlighted that the participants should focus on the features that mobile application could have, how the user would navigate and access them, and how they could be named.

**Idea generation.**

Right after the Problem was presented, there was a 10-minute individual idea generation (3D activity), an individual brainstorming session where the participants were asked to write one idea for post-it, and it was explained that the idea did not have to be full developed and could even by a basic sketch of what they had in mind, they were asked to write as many ideas as possible without thinking or evaluate them.

The participants were then asked to set the ideas they had generated to the side, and were introduced to the Person-Analogy cards (Figure 1.) After the introduction, a 3D case was introduced so the participants had a chance to use the stimuli cards:

o The 3D case consisted on generating as many ideas as possible to develop a new kind of Movie Theater. To do this, the participants were divided in pairs, and were asked to take turns generating one idea at a time in their group, looking at the first person/profession in the stimuli cards when it was their turn. The stimuli cards contained Person/professions such as: astronaut, lawyer, teacher, bank robber, among others. This exercise took around 5 minutes.

The participants were asked to sit down. Once they were on their chairs, they were showed a slide with the problem for a minute or so, were reminded of the area and purpose focus, and were given the task to generate as many ideas as possible with a person-analogy (3D activity). Three person-analogy were given, one at a time, with 3-minutes to write ideas on post-it for each stimuli: taxi-driver (Figure 2.), carpenter and doctor.

After this, the participants were introduced to the Picture stimuli card (Figure 1.). Then a 3D case was introduced:

o The 3D case consisted on generating as many ideas as possible to plan a vacation trip in pairs, using one image at a time from the stimuli cards to generate ideas in turns. This exercise was around 5 minutes between instructions and performance.

The participants were asked to sit down, and were showed the problem again, and the area and purpose focus were reminded. Then a new session for idea generation followed (3D activity) and the participants were showed three stimuli pictures, one at a time, and were given 3 minutes after each to generate and write ideas. The pictures were: a green plastic watering can, blue scissors and a red ceiling lamp (Figure 2.).

After this, the word stimuli cards were introduced (Figure 1.). They were asked to perform a 3D case using the cards.

o The 3D case consisted on building a story in pairs. Starting with "I went for a walk and…", then each participant, in turns, were asked to look at one word at a time from the stimuli card and generate an idea from it. The exercise took around 5 minutes.

The participants were asked to sit down, were showed the problem and reminded about the area and purpose focus once again, and were asked to generate more ideas (3D activity) after being showed three words, one at a time, and were given 3 minutes after each to generate the ideas. The words were: door, bus (Figure 5.) and chair.


Figure 2. From left to right, examples of slides showed to participants for stimuli: Person-Analogy, Picture, and Word stimuli.

Byrge and Hansen (2015: 3D Cases) argue that using stimuli training cards help: (1) "make oneself" get an idea if asked to associate with a specific word, picture, or item; the cards take away responsibility from the participant and makes it easier to come up with all kinds of ideas (2) random stimuli can force the thinking direction to places that a participant would not normally reach from their own internal stimuli; flexibility in change of perspective can lead to different kinds of ideas (3) some stimuli are related to the problem, but only horizontally; these stimuli are difficult to produce for someone that has not taken creativity training.

This phase gives a clear picture of the standard process in the Creative Platform that consists of 3D case > 3D activity > 3D case > 3D activity, and so forth, that is used throughout the workshop. The objective of the 3D cases here were to train the participants to use a given stimuli and generate ideas on command, without explaining or reflecting on how

this process is done, and reaching the objective of horizontal thinking, increasing the Fluency and Flexibility in generating ideas, important cognitive process in creativity, as explained in the Theoretic Background of this project. The 3D cases also trained the participants to say “yes” to ideas and to develop on other people’s ideas without evaluating them.

After this phase of idea generation, a 15-minute break was given. There was coffee, tea and snacks for the participants, and the possibility to go out for smoking.

After the break, participants were instructed to gather all their ideas, were divided in two groups; one of two participants and the other of three. Then, they were asked to paste their ideas one at a time on a wall, taking turns until there were no ideas to share. Before pasting each idea they had to make a 5 second explanation about it to the rest of the group. Once all the ideas were posted, participants were instructed to choose one idea they liked, and wanted to develop further.

**Bringing subject knowledge.**

Once all participants had chosen an idea, they were asked to put it aside until it was needed again. Then two 3D cases that follow the “What happens next?” and “New offer” example from the authors were instructed:

o Byrge and Hansen (2015: The General Process Model of the Creative Platform) developed these 3D cases to train people’s ability to say “yes” to ideas. The authors argue that people sometimes think they say “yes” when they are really saying “no” by introducing a “Yes, but”. These 3D cases train the participants to let go of discussions and choices they make. “When it comes to creativity you need to accept the far out or dangerous ideas before anything interesting and original may happen. The combination of body, language, and attitude becomes very important” Byrge and Hansen argue. The first 3D case was done in pairs, and took around 5 minutes with instructions and performance. The exercise consist on imagining that the group is in a deep, dark, mysterious forest, and the participants want to find their way out, they see a path and decide to take it, and they encounter dangers and see things, each participant takes a turn to come up with an idea and asks the other “What happens next?”. The participants are instructed to move around the room, following the path and pointing at things they might encounter.

o Changing partners, the next 3D case is similar, but this time the participants can ask for another option from their teammate. After they hear the new idea, they can decide to take this new offer or go back to the original one.

After these 3D cases, the participants were asked to sit down in groups. Then, each participant took a turn, and shared the idea they picked. After presenting the idea, they ask the other members of the group to help them further develop that idea by sharing their thoughts, opinions, and opportunities they saw. They are instructed to bring the “What happens next?” and “New offer” logic to this 3D activity. Each round of consultancy takes around 4 minutes, and around 12 minutes in total. The participant that presents the idea is instructed to write down the ideas received by the other members of the group, and there is no discussion or evaluation if the idea is good or bad, possible or not.

A new 3D activity follows where the participants are asked to create a “rough prototype with paper and pen” as a graphical representation of their idea. This is done individually. The problem and the area and purpose focus is reminded once more. This activity takes around 20 minutes. Paper is given with the resemblance of a Smartphone to draw the wireframes/sketches (Figure 3.), as well as print-out with design elements of Smartphones and Virtual Reality found online.

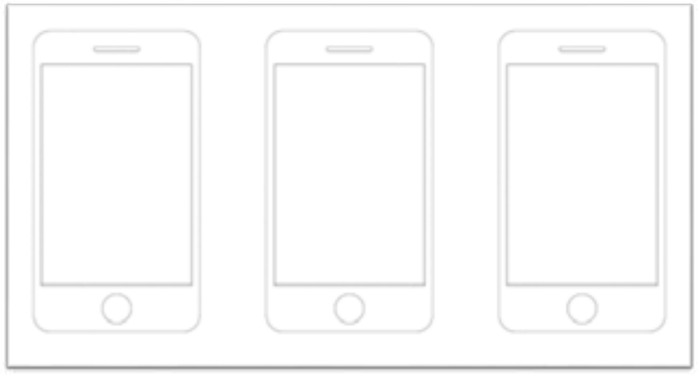


Figure 3. An empty smartphone wireframing paper

After this first “prototyping”, participants were given another 3D case based on role-playing:

o This role-playing 3D case was carried-out in pairs. It consisted on asking the participants to imagine that one participant was an entrepreneur that created a new concept for online travel ticketing, and the other participant was a TV reporter that would ask questions and enquire about this new concept. The role-playing involved imagining that the entrepreneur was demonstrating the online ticketing to the reporter. The participants then switched roles. The exercise was about 12 minutes including instructions and performance.



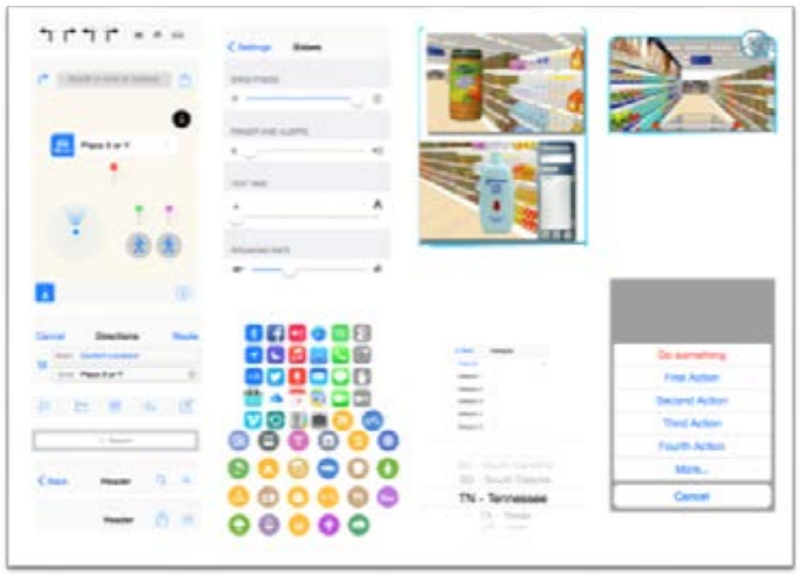


Figure 4. Design elements print-out.

The participants were then asked to unify the two sketches in one group (3D activity), in a teamwork prototyping. This activity took around 15 minutes.

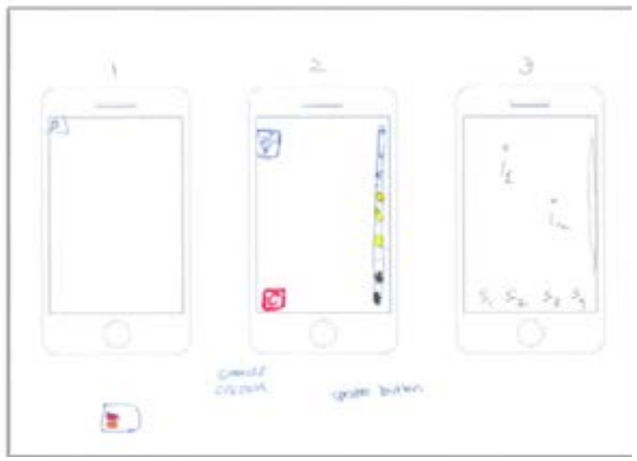
**Blue carpet.**

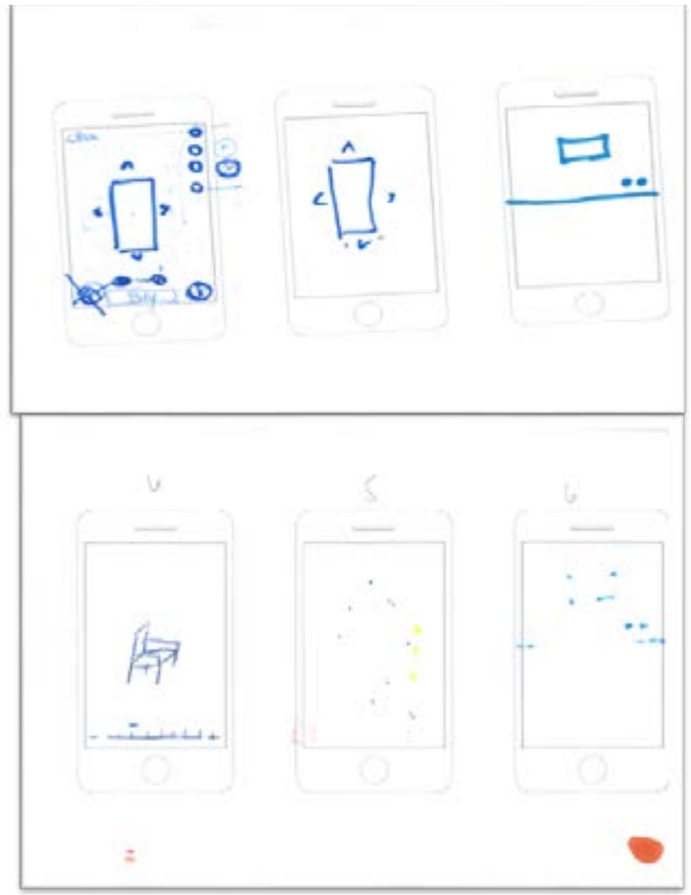
After the sketching 3D activity ended, participants were then explained that they would have to present their “rough prototypes” to the company. One person was chosen to explain the outcome.

A 5-minute break was given to participants before the presentation, and they were invited to make adjustments to their sketches, prepare themselves or just to take a mental break before the presentation.

After the presentations, the participants were asked to reflect on the creative process they had gone through. What they liked or did not like. How the process could be improved.

**Sketches produced**





**Notes on the process**

The acknowledgment sheet arrived at least half an hour after the workshop started. This was the first “agreement” between the participants and the facilitator, and had to be signed later in the process

The demonstration of the prototype was done through a phone, that could have caused that some participants expressed some misconceptions about VR (zooming with your hands, etc)

There were many questions regarding the demo that were not directly related to the problem presented. Many of the questions were related to the technology used for creating the models of the items

There was insufficient transfer of knowledge regarding VR, as it was demonstrated at the end of the workshop

The energy of the group and their creative presence felt after the break

The wireframe used resembled a Smartphone, and could have caused the above mentioned problem

The print-out with design elements was not used, and also resembled some features found on a Smartphone

The design elements were not used by the participants

When the participant in charge of presenting the group’s solution, one person from the company stopped him and questioned the participant’s evident misconception of VR, since he was explaining an interaction not possible when using VR googles. The rest of the group reacted by grabbing their things and excusing themselves. They were stopped by the facilitator at this point to express some other ideas they had generated during the workshop



The room at the venue had several unnecessary stimuli, with people walking in and out, distracting the participants. The coffee and snacks were put on a table and caused unnecessary distraction, since some of the participants stopped the tasks they were doing to grab a snack in different moments of the workshop.

One person left the workshop around half an hour before the workshop ended, this caused unnecessary stimuli and from there on the participants looked more anxious to leave, and their contribution was affected

One member of the group, one that had not been part of the discussions of the group of three people, and had lost his team member, was the one that took the initiative to present the group’s solution, with unsatisfactory results

Unifying the ideas limited the amount of solutions presented and their creativity

**Ideas produced that were not further developed**

Time to load image should be short

What products are suitable for VR? Presenting a chair and/or jewelry requires a different approach

Clients (shops) should come up with the idea of the environment in which the article is presented

Is it possible to use the product in the virtual world

Show how do you assemble the product (content)

Show the article in different light

Make the control wood-like

Possibility to manipulate the object (put it apart, put it back together)

People should see how an item is made / what are the materials

They should be able to see how durable it is

If the item is easy to use

If the item is easy to reach

People should be able to move around the object

How does the product react with water

Can you see how the product reacts when it comes in contact with natural elements

Change color / see different options

People should be able to change the environment / background / to see how the item looks

Activate options of the products in VR

Short description on buttons

Presented in a not too crowded environment

Buy button in the corner

For furniture or other materials used in the home, products show accurate size

How will clients submit their products? Pictures? 3D Models?