

Using Virtual Reality and 360-degree Photos and Videos in Marketing

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<p>Virtual reality has been up and coming for years and there are a lot of possibilities for marketers. Still in year 2018 not many of the companies have invested into virtual reality or 360-degree photo/video marketing.</p> <p>This thesis is all about the technologies and history behind virtual reality and how marketers could use virtual reality as their part of their marketing activities. It will tell you all the important numbers about virtual reality, what popular VR headsets there are and what kind of actions you can take to use virtual reality in your marketing.</p> <p>Travel industry is one of the industries which will benefit the most from virtual reality and 360-degree video/photos in their marketing since the visual content is extremely valuable in travel marketing. Virtual reality offers marketers new way to market locations and accommodation by sending them there, virtually and it creates possibilities for agencies, too.</p> <p>It also offers new ways for more effective advertising since the users are completely immersed into the content.</p> <p>Many Real Estate businesses are already using VR since it allows them to showcase future projects that they haven't even started building and gain revenue from early on.</p> <p>Virtual reality also offers a "WOW"-factor and companies like Lenovo are already using it in their trade shows successfully as the 350% increase of the leads shows. Companies can now invite all their peers around the world to their events by using livestreaming with virtual reality.</p>	
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1 Introduction

This part of the thesis will explain what virtual reality does mean, how it works, about its history and how is virtual reality doing right now.

1.1 The purpose of the research

Virtual reality is one of the technologies which can have big impact in our lives in the next few years, so it is crucial for us to understand what it really is and what it can do right now and in the future. It is already impacting the ways we can learn, play and how we can meet without physically being there. But it is also being used in marketing and it is important for marketers to know how they can benefit from this technology.

The purpose of the research is to educate marketers on what virtual reality is and how they can use it for getting results. It guides you through the history and future of VR, tells you about its current state and what “big players” there are in the industry and leads you to the actions marketers can take if they wish to add virtual reality as part of their marketing strategy. By reading this thesis one should understand what virtual reality is, how one can use it in marketing and what the future holds with virtual reality.

1.2 What is Virtual Reality

According to Oxford dictionary the definition on virtual reality (also known as VR) is: “The computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment, such as a helmet with a screen inside or gloves fitted with sensors” (Oxford Dictionary 2018.). What it basically means that virtual reality is computer-generated reality where user can interact with the surroundings. In this thesis we will also consider 360-degree video as part of “virtual reality” since it is also often discussed as a part of virtual reality.

Most people associate virtual reality with gaming, but it is much more than a gaming platform. In virtual reality architects can build complex structures which are not possible in the real world because of funding or physics. People can travel around the world virtually in just a few clicks and doctors can practice their operating skills without fear of hurting someone or something.

Virtual reality is gaining more and more popularity every day but there are some issues restricting it to become as a part of peoples’ everyday life. One of the biggest issues is the

total cost for the user: the cheapest possible setup for you to use with a PC will cost you something between 1200-1500 USD for you to be capable to use Oculus Rift. There is cheaper option if you are into gaming consoles since PlayStation 4 with all the needed items for using PlayStation VR will cost 600-700 USD. The most used virtual reality devices are VR-headsets made for mobile phones. In terms of usage most popular single virtual reality headset is Samsung Gear VR with 5 million units “sold”. With these devices comes another problem, the computing power. People are ready to produce high quality content for virtual reality but unfortunately, we cannot use this content yet because of lack in computing power. This topic will be more covered in next chapter, virtual reality devices.

Another big problem which virtual reality faces is lack of content. Since the number of users is still quite small, there are not many people producing content for the devices. Also, there are multiple platforms for content and no unified standards, but the future is aiming towards unification and you can already use multiple app stores for downloading content.

If successful virtual reality can create completely new platform for marketing that hasn't been yet discovered by many companies. VR allows you to create more interesting content for your audience and gives them more realistic experiences than ordinary videos or applications can: you can send them to your new resort or let them test drive your new car. The technology also cheats your brain to think that you are there. This is what makes it more memorable than regular 2-dimension videos or applications ever can. According to the HTC Vive China's President Alwin Wang Graylins column kids can learn much faster by using virtual reality education compared to the traditional education (RoadtoVR 2018.). When audience equips the VR-headset, they are immersed in the content and not distracted as easily compared to ordinary videos or applications since they need to take the headset off before doing anything else, so you get full attention to your message. Since it is relatively new tool for marketing, it also attracts more new crowds and media, so your marketing campaign can get even more attention than expected. As seen from the graph below the interest towards virtual reality has rapidly increased since early 2016 and even though the number of searches has slightly decreased in 2017 the trend is going up again. The peak times for the searches have been during the Christmas time and important product launches.



Figure 1. Number of searches from 14.4.13.-14.4.18. on Google (Google Trends 2018)

1.3 History of Virtual Reality

The history of virtual reality can be dated back to 19th century and to the 360-degree paintings which were trying to get the user feel like they are part of the scene. The real breakthrough for virtual reality happened in 1838 when researcher Sir Charles Wheatstone invented stereoscope and its technology. Wheatstone realized that human brain can combine two photos into one if one photo is showed to one eye. This effect made the combined image to seem more “deep”. The device which combined these two images into one was called stereoscope and the technology is still used for the lower tier mobile VR headsets like Google Cardboard.

The next breakthrough for virtual reality happened in 1950s when cinematographer Morton Heilig invented device called Sensorama. It had speakers, stereoscopic screen, moving chair and even smell generators. Heilig filmed six short films for the Sensorama all by himself.



Figure 2. Sensorama (Wikipedia 2016)

In 1965 Ivan Sutherland created the concept of “Ultimate Display”. For Sutherland, “Ultimate Display” meant that you could view computer-made 3D world (including the 3D sound) and performs actions in that world. In 1968 Sutherland brought his concept to real life with his student and created “Sword of Damocles” – first computer powered VR-headset. The headsets feature’s and design were extremely basic, and it was hanging from the ceiling since it was too heavy to be comfortably used otherwise.

The next major steps for virtual reality were in the end of 1980’s and in the 90s. The term” virtual reality was popularized and first company to sell VR-headsets was VPL (Visual Programming Lab). They also invented a glove which you could use in virtual reality world and it would follow your hands movements. In the 90s there were VR-arcade machines and companies like Sega and Nintendo launched their own VR-headsets, but both failed to see mass scale adoption or in the Sega’s case even mass production.

From that point the technology for virtual reality has developed rapidly and after Google’s launch of Google Cardboard and Facebook’s Oculus acquisition many of the tech giants are investing into VR development.

1.4 Year 2018 for virtual reality

Many sources were betting on the year 2017 being the year of virtual reality but there is still long way towards the estimates as the graph below shows. According to the Super-Data the number of shipped VR-headsets decreased in 2017 instead of the most estimates for some of the brands:

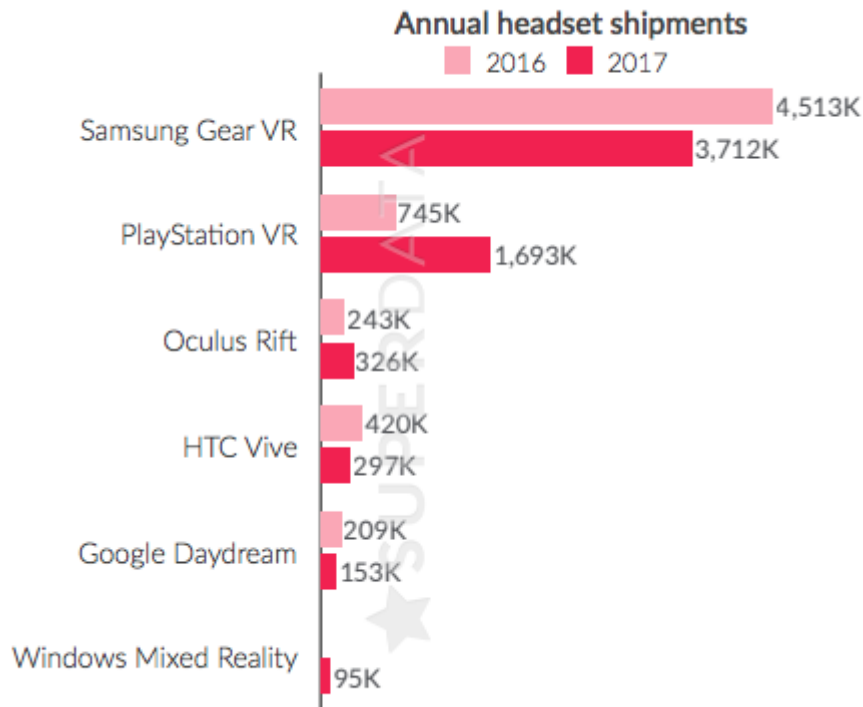


Figure 3. Sales of VR in 2016 & 2017. (SuperData 2018)

Still, virtual reality is considered as one of the “next big things” according to various sources. M&A firm Digi-Capital predicts that the virtual reality industry will be worth 30 billion USD by the year 2020 and in 2025 it can already be worth 80 billion USD according to Goldman Sachs (CNBC 2016.). The sales of virtual reality goggles will also increase in the future, estimates varying from 500 million VR/AR-devices sold by year 2025 according to Piper Jaffray investment bank (UploadVR 2015.). That’s a big change to compared to current estimate of 13.65 million devices being sold in year 2017 (Statista 2017.) so the potential of the market is great. That is the one of the main reasons big companies like Facebook, Apple, Sony, HTC, Samsung and Google are interested in this technology and developing their own devices and software for the virtual reality segment.

2018 can be considered as good year for virtual reality since the technology is improving constantly and all the major brands launching their new headsets in 2018 with the biggest launches being standalone headsets from Google, Oculus and HTC. One major part for mass adaption is the content and the amounts invested to VR/AR companies increased in 2017 so we will see more companies entering the market with their products. According to the DigiCapital VR/AR industry got over 3 billion USD in investments in 2017 which is the new record for the VR/AR field (DigiCapital 2018.) and be considered as a possibility for a breakthrough for the VR/AR industry.

2 Virtual reality Headsets

Virtual reality devices can be separated in two different types: to ones which use computers (or consoles) and ones which use mobile devices to power them. Main difference between mobile VR and Stationary VR (PC and console-using devices) is that the quality and controls are far more advanced in stationary VR. Stationary VR also comes with a lot higher price tag and the need of highly powered computer or PlayStation 4.

In the interview with the Henrik Helin he mentioned the high prices being a problem for VR and said the prices need to be lower for the mass to adapt.

There are also other manufacturers of VR headsets, but they are either smaller than ones mentioned below or have their focus only on the Chinese market.

The market share of the different headsets looked like this in 2016:

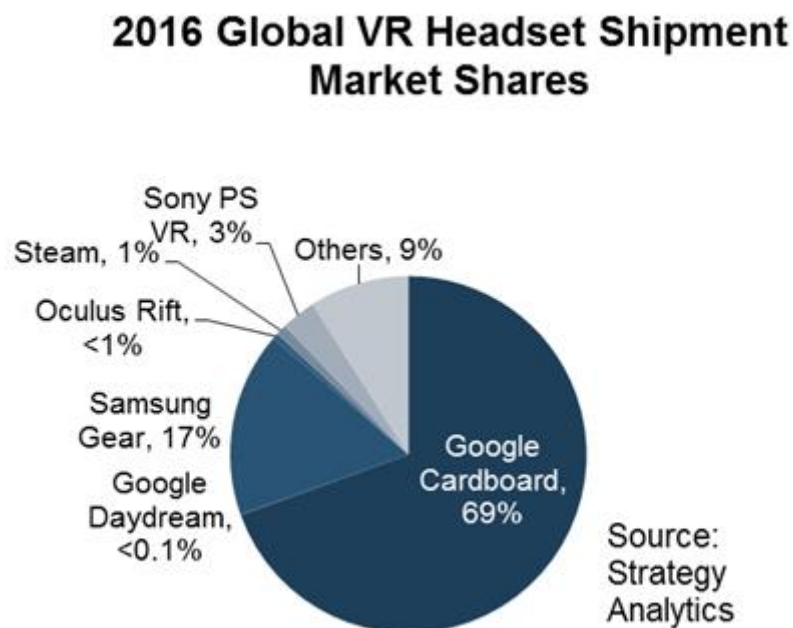


Figure 4. Global VR Headset Shipment Market Shares in 2016 (Strategy Analytics 2017)

2.1 Mobile VR Headsets

Mobile VR headsets are most sold headsets based on statistics from year 2016. In 2016 there were over 90 million mobile headsets sold according to SuperData (SuperData

2018a.) and Google cardboard was the biggest seller with 88.4 million headsets sold followed by Samsung gear VR with 2.3 million headsets. These numbers don't even tell us about the amounts of Chinese mobile headsets which have been sold in millions. So, let's look at some of the most popular mobile VR headsets in more detail.

In the interview Henrik Helin said: "Personally, I see the best potential in mobile VR so that the people wouldn't have to have PC's with them, just a mobile device is enough." (Henrik Helin 17.11.2017.)

2.1.1 Google Cardboard



Figure 5. Google Cardboard (ITead 2018)

Google Cardboard VR-headsets have the biggest market share with 88.4 million headsets sold in 2016. One of the reasons for that is the price tag of 5 USD and you can brand it, so a lot of brands have their own branded headsets. It was launched in 2014 by Google and since then gained a lot of popularity. You can purchase one from Google or make one yourself by using instructions provided by Google. Many companies also copied the idea of the headset and built their own higher quality headset and these headsets are popular especially in Chinese market.

2.1.2 Samsung Gear VR



Figure 6. Samsung Gear VR (Samsung 2018)

Samsung Gear VR is the second popular mobile VR-headset with total of over 5 million devices distributed worldwide in 2016. It was released in 2015 and Samsung gave these units for free for buyers of Samsung S6 and S6 Edge mobile phone buyers, so the real sales amount of the headsets is 2.3 million in 2016 and expected to be 4.1 million in 2017 (IHS Markit 2017.). Samsung Gear VR comes with their own Oculus powered app store which currently has over 600 apps. They launched newer version of the Gear VR in April 2017 to work with the new Samsung Galaxy 8-series and the newer Gear VR supports Samsung Galaxy-series from S6 to S9. And what's the most special thing about the newer Samsung Gear VR is that it has its own controller which was missing in the previous version.

2.1.3 Google Daydream View



Figure 7. Google Daydream VR (Phys.org 2016)

Google Daydreams first version was released in November 2016 with the launch of the Googles Own Pixel mobile phone-series. It's the main competitor for the Gear VR and according to the IHS Markit the sales will be around 2.23 million sold devices in 2017 (IHS Markit 2017.). It also has its own app store (which has less apps than Gear VR) and comes with a remote. What makes it special compared to the Gear VR is that it supports phones from other manufacturers too and even the new Samsung Galaxy S8-series. It received minor design update in late 2017 and is now shipped with more colours.

2.2 Stationary VR headsets

In 2016 there were only 2 million stationary headsets sold according to SuperData. Even though stationary VR offers superb performance compared to mobile VR they are still far behind the sales. One of the biggest things lowering the sales is the cost: Stationary VR requires powerful computer (price around 1000USD) or PS4 which costs around 300USD. Then you need to spend 300 to 600USD for the VR headset so even the cheapest setup will cost you more than 600USD. With the higher price tags these headsets offer also more features than mobile VR headsets. They have advanced controllers, you can move

inside virtual reality and have superior graphics compared to mobile VR. With the higher graphics you get also higher refresh rate which helps people for not suffering from “virtual reality sickness” which is result of too low refresh rate and causes symptoms like nausea and headache.

2.2.1 PlayStation VR



Figure 8. PlayStation VR (PlayStation 2018)

PlayStation VR was the most sold stationary VR headset in 2017 and has sold almost 1,7 million units in 2017 (SuperData 2018) which is more than HTC Vive and Oculus Rift have sold combined according to the market data. It is few hundred dollars cheaper than Vive or Rift and only needs PS4 to run it, so people don't need powerful computers to use it. The prices for PS VR start from 300USD.

2.2.2 HTC Vive



Figure 9. HTC Vive (VRBound 2018)

HTC Vice is stationary VR-headset from Taiwanese electronics company HTC and American Valve Corporation which is known from games like Counter-strike and software distribution platform Steam and the headset was launched in April 2016. It is the second most sold stationary VR-headset with 297 000 units sold in 2017 (SuperData 2018a). HTC Vive uses Steam VR to distribute content to its users. They also launched Pro-version of the

headset in 2018 which comes with a higher resolution and the possibility to use it wirelessly with adapter which is not possible with the basic Vive headset.

2.2.3 Oculus Rift



Figure 10. Oculus Rift (VRBound 2018.)

Oculus Rift was the VR headset which started the real interest on virtual reality and is the main competitor for HTC Vive. The official launch of the consumer edition was in March 2016. It was acquired by Facebook with price of 2 billion USD in 2014. It is also least sold headset with only 362 000 units sold in 2017 (SuperData 2018a) and had some problems with their shipments has its own app store called Oculus. It retails currently for 399 USD with the Touch controllers after some big price cuts in 2017.

2.2.4 Microsoft Mixed Reality headsets



Figure 11. Windows Mixed Reality headsets (IO-Tech 2017)

Microsoft entered the VR-hardware space with their branded “mixed reality” headsets to compete with Oculus and HTC. The “mixed reality” term used as the product name is confusing since the headsets don’t have any mixed reality capabilities, yet but according to the Microsoft that might not be the case in the future. What makes them so special is that you don’t need to have top-tier PC to use their headsets and modern mid-priced PC with Windows 10 should do the job. It also has six degrees of freedom built-in, so you don’t

have to buy any external sensors. The price for their headsets depends on the manufacturer but the prices including Motion controllers are from 399 to 499 USD. The 399 USD and 449 USD ones come with 1440x1440 resolution (per eye), LCD displays and have slightly different designs and field of views. Samsung's 499USD Odyssey headset comes with higher resolution (1440x1600 per eye), AMOLED display and built-in AKG headphones and according to the tech news site The Verge it can be considered as a real competitor to Oculus Rift. Samsung's headset is currently available only in the US.

2.3 Standalone VR headsets

According to the chairman of FIVR Ry (Finnish Virtual Reality association) Olli Sinerma and Henrik Helin and some other industry experts that next big thing in VR headsets will be the standalone VR. By standalone VR headset they mean that the VR headset doesn't need a mobile phone or PC to work, it has all the technology built-in, so you can say goodbye to all the cables and charging phone. All the big players in VR are currently focusing on building their own standalone headsets and racing who's going to be the first on the market. Some of them will have motion sensors built in, so you don't have to buy any external sensors to achieve the six degrees of freedom.

2.3.1 HTC Vive Focus VR



Figure 12. HTC Vive Focus (Slashgear 2018)

HTC Vive Focus was revealed in Mid-November, a month later after Oculus introduced their own standalone headset. It runs on Qualcomm Snapdragon 835 (same processor which is used in many latest flagship mobile phones). It is also the first commercially available standalone headset which supports six degrees of freedom. HTC's focus for this headset was China and in March 2018 they announced that the headset would also be available worldwide during 2018. At the launch event HTC also announced that its plans of making standalone headset for the Google Daydream platform were cancelled. It was launched in China early 2018 and costs 3 999 CNY (635 USD) for white model or 4299 CNY (684 USD) for the blue model.

2.3.2 Oculus Go



Figure 13. Oculus Go (UploadVR 2018)

Oculus announced their first standalone headset Oculus Go in Mid-October. What makes it different from HTC's Focus is that it's probably going to be cheaper with 199USD price point since it doesn't support six degrees of freedom or fully tracked controllers and ships with lower tier Qualcomm 821 processor. It also has spatial audio built inside so you don't need additional headphones. The controller of the headset is like the one in Samsung Gear VR, so the developers can build apps for both Gear VR and Oculus Go. Developers should be getting their kits in November and it should be available in early 2018.

2.3.3 Lenovo Mirage Solo with Daydream



Figure 14. Lenovo Mirage Solo with Daydream (Lenovo 2018)

Google's answer to their competition on the standalone VR-headset market comes from computer manufacturer Lenovo. Daydream standalone VR-headsets were originally supposed to come from both HTC and Lenovo, but HTC retired from the deal and decided to launch their own standalone headset instead. Headsets sensors support the six degrees of freedom with the Google technology called "WorldSense" so you don't need any external sensors and can freely move around. It comes with Qualcomm Snapdragon 835 (same as in the HTC Vive Focus) and with QHD screen and will start shipping during spring 2018.

3 Research methods

Research was conducted by using qualitative research methods. Qualitative research method was chosen as a main research method since there is no database of companies using virtual reality as a marketing tool and we wanted to get better insights on how companies could benefit from virtual reality marketing. The persons chosen for the qualitative interviews were found on the Facebook group page of the FIVR (Finnish Virtual Reality Association) where I posted and asked for volunteers for this interview. Only two people responded to me out of 1506 members and both were chosen for the qualitative interviews. The interviews were held 17th of November 2017 at Café Pirita in Helsinki. One of the interviews was an interview by phone and second one was a face-to-face interview. The interview questions were sent to the people interviewed beforehand, so they could prepare for the interview. The questions I asked were different for the both persons since they were working on different aspects of virtual reality industry. The persons chosen for the interviews were Olli Sinerma (Chairman of the Finnish Virtual Reality Association) and Henrik Helin (CEO of the 360mediatalo). Olli's association FIVR is leading association for VR in Finland and is closely working with VR developers and investors and towards making Finland as a leading country for virtual reality in Europe. Unfortunately, the interview with Olli was recorded phone call and the file which consisted the audio of the interview was corrupt, so the data gotten from the interview is only based on notes and the memory of the interviewer. Henrik is the CEO of 360mediatalo which is focusing on creating 360-videos and virtual reality applications for marketing purposes and showcased their work in various trade shows in Finland with their clients.

The research was based on the question of how virtual reality could be used in marketing and what kind of tools marketers can use. The first part of the research was to find information about virtual reality and how it had already been used in marketing and what other possibilities there could still be for the marketers. Since there are not a lot of books about virtual reality and its use in marketing, most of the research was done by searching information from the internet which has a lot of interesting articles about the subject. These articles were about the different areas where virtual reality is already being used as a marketing tool and some insights with statistics about the VR field. The main reason for the small amount of information is because of the reason that technology is still quite new and has not reached its full potential yet.

The second part of the research were the interviews with the virtual reality specialists who would provide me with some insights about the industry and support the theory written in the thesis. The questions were about the virtual reality, what is its place in Finland and

how marketers could benefit from it. We also discussed some cases which have been done in Finland and some interesting companies in Finland working in the VR-field. These questions were customized for the both persons since they were working in different areas of VR. These questions can be found in the attachments (Attachments 1 and 2).

4 Applying virtual reality marketing

This chapter will discuss about how virtual reality marketing can be used in different industries or areas of marketing. Topic will be based on research and the real-life examples of the companies which have already implemented virtual reality marketing as part of their marketing strategy and how they have done it.

In the interview Henrik Helin mentions the reason he got into VR-marketing as follows: "The mission of marketing has always been the same: getting into the people's minds and them to remember the concept you are providing to them. And VR sticks with you much better than traditional marketing and that was my thing." (Helin 17.11.2017.)

4.1 Virtual reality in travel industry

Travel industry is currently in the era of big changes since most of the information regarding traveling is found online. You can compare the prices and services of accommodation and flights in just a few clicks. Travel agencies are reducing the amounts of brick and mortar locations and starting to focus on their digital presence instead. According to Statistic Brain 57 percent of all travel reservations are made via online in 2017 (Statistic Brain 2017.) so being online is crucial for businesses to survive these changes. There are few indications that virtual reality might be the next big thing for the travel industry: The media has talked a lot about virtual traveling and many major companies in the industry have started experimenting the possibilities of VR and producing content for their audiences.

Google studied travellers' habits in 2014 travel study and came up with some interesting details. The study tells us that amongst price the main reason why people book their travel from online travel agencies are the site tools and options. One of the tools could be possibility to virtually feel the hotel or location at your home. But more importantly, 56% of the leisure travellers find their inspiration to travel from the internet and 83% of those people found social networks and video sites to be their top source of inspiration. Especially videos were important when thinking about taking the trip and when choosing the right destination. (Think with Google 2014.) Virtual reality gives users even more immerse and memorable experience so that could be one of the keys to get customers to choose your company.

When making the virtual reality content, I would also think about the languages you are using: according to the study by Visa and Oxford economics, Chinese speaking customers will be spending more than 250 billion USD to traveling in the year 2025 (Visa 2016.).

Many Chinese don't understand English, so this is one more way to attract broader audience. Especially virtual reality will be a big thing there since the virtual reality market will grow from 249 million USD in 2016 to 1,7 billion USD in 2021. (Research and markets 2017.)

4.1.1 Marketing travel locations

In my opinion, this is one of the most important ways to get tourists to visit your country or city. Many countries and touristic cities have their own tourism boards and are responsible of marketing the country or city. At the time of writing, only few cities have been using virtual reality in their marketing, even though there are great possibilities. If you search YouTube, you can only find few 360-degree videos from big cities even though virtual reality videos are attracting more and more crowd every day. Good example of attracting crowds is video tour made by New York Times in the city of New York. It has been out in YouTube for a year now and has over 2,3 million views and still getting decent amount of new views.

Good and easy way to get more tourists to choose your country or city from your competition is to do short video about the place you are marketing. According to HospitalityTech the ones who finished watching video ad about the city were 23 times more likely to book a stay in that location (HospitalityTech 2015). Great way is to make 360-degree guided tour video about the location. This could be done as example below suggests.

Example:

Country/city X wants to attract more tourists and decides to make a 360-degree VR-compatible guided tour video about the place. 360-degree video allows interested people to see city in completely new perspective and with the use of VR-headset person can almost feel like they are already there.

Good way to do this kind of guided tour would be to have someone who is well known to their target audience to guide them through the place and visiting their favourite spots in that area. Another idea would be to just hire a guide and show their audience places of interest. This could be done as co-creation with local places of interest and services to receive the necessary funding for the video. When filming is finished, it would be shared to the social media and not only by the country or city but also by all the participants of the video (places of interests, guides and filmmaker). This would share the experience to

much broader audience. It might even be featured in the news since the technology is new and interesting.

This type of VR-content could be used not only by the tourism authorities but all kinds of companies. For example, booking.com and TripAdvisor offer their customers free travel guides and what would be more interesting way to give your customers additional value than experience like this. They could explore the city even before landing and could decide what they want to do during their trip.

4.1.2 Marketing travel accommodation in virtual reality

Internet has made comparing accommodation much easier and new ways of travel accommodation are being offered so it is even more crucial to stand up from the crowd. According to the study conducted by Statisticbrain there are 148.3 million bookings made online each year. Surprisingly, 65,4% of these bookings are made directly from the hotel websites (like marriot.com). Rest of the booking are made from merchants like Expedia or retail websites like booking.com. (Statistic Brain 2017.)

Euromonitor study also suggests that by the year 2020 more than 44% of the total bookings are done from online and the share of the smartphone bookings will rise in the future (Euromonitor 2016.) so this means that the hotels and other travel accommodation services should put even more effort to be visible online.

Photos are really good way to generate more engagement and according to a study by TripAdvisor 73% of travellers use photos to make decisions (TripAdvisor 2013.) so it is crucial for the companies to include photos to their website and in this case to the TripAdvisor. Study was conducted in 2013 so four years later some of numbers might have changed but the fact still is that more photos means more engagement. Nowadays we could consider using 360-degree photos and videos as important as the photos where in 2013.

Even more impactful way to attract more engagement is to have videos about your accommodation. In 2013, around 51% of leisure travellers, 69 percent of business travellers and 55% of affluent travellers watch travel videos online (Google The Traveller 2013.) so the audience for the videos is broad. 50% of the people would prefer to watch videos on hotels own website and 32% from YouTube. 68% of the travellers would prefer information about the amenities and features of the hotel and 32% prefer information about nearby activities and 57% think the most important content are the rooms, suites and

common areas. For the nearby activities, most interesting was the dining/bar options and outdoor activities. The preferred type of the video was that it should be informational and tell you about the hotel, services and location. The most interesting fact is that 37% of the answerers would prefer a guest to narrate the video and 31% want the video without narrator. (Software Advice 2014.)

Since virtual reality is quite new thing there are not many accommodations that provide 360-degree videos to their possible customers. One of the first companies to use virtual reality as a marketing tool was hotel chain Marriot who let newlyweds to try their VR-experience in a booth which contained VR-headset and some special effects like wind. The visitors were “teleported” to one of Marriot’s various resorts around the world. Best Western is working with Google Street View to let their users to access indoors of the hotels from the Street view in 2 200 of their locations in North America and Airbnb is partnering with Matterport for making 360-degree photos and 3D-models for some of their listed properties. Hilton also announced their VR-application in which you can visit some their resorts around the world and can find some 360-degree videos from smaller hotels in YouTube. Still, there is not much content about hotels in 360-degree format even though it offers whole new way to gain information about the rooms and services provided by the accommodator. With VR-content you can also gather new kind information about your audience: where are they looking in the room or public areas and what kind of rooms are more interesting. These are just some examples of the analytics you can get from VR against traditional video where you cannot control where you are watching. So how could hotels provide virtual reality experience to their possible customers? I will introduce you some ideas below.

Easiest way for an accommodator to produce their 360-degree video about the accommodation would be to hire a person who is capable of filming and editing 360-degree video. Video should be informal: tell people about the rooms and amenities, facilities and public areas. One should include different type of rooms since customers might get interested of paying more if they can feel the difference between cheaper and more expensive rooms and virtual reality is as close as you can get to feeling it without being present. Accommodator could also make a video about the points of interest and services available nearby since they were considered important in the study mentioned above and can attract new audience to your website or YouTube-page (people searching about places of interest in city X).

If your company is part of bigger chain, it would be beneficial to consider making a mobile application to see the content since you can gather more analytics and provide calls to action after the video. In the application, you could choose the location where you want to go and which hotel you would like to see. Also, there would be videos of the places of interest and not only about the accommodation. After finishing watching the video it would include strong call to action and watcher could continue straight to the booking page after watching. Application would work on Android and iPhone and videos could be watched in 360-degree format and in format for virtual reality headsets.

4.1.3 VR-marketing for travel agencies

Travel Agencies are constantly finding new ways to market their services to customers and traditional travel agencies with brick and mortar locations are getting harder to find in many countries since online sales are increasing every year being predicted to be 694 billion USD (Statista 2016a) in 2018 for all the travel services (Hotels, flights and other services).

This gives huge pressure for the brick and mortar stores and they need have new ways to attract customers to their locations and try to digitalize their services. One way to attract customers is to your location is to have something special at your store and that is what Thomas Cook did: They added VR-headsets to their flagship stores in UK, Germany and Belgium in 2015.

They filmed 360-degree VR films at their travel locations in Egypt, Cyprus, Greece, New York and Singapore and filmed different activities you can do there like snorkelling in the red sea or taking a helicopter tour around New York. It was launched in 2015 and was a huge success: it had press coverage from Bloomberg and Marketing Week, generated sales of 12 000 GBP in UK and Germany with return of investment being 40%. There also was a 180% increase on their New York tour sales. (Bloomberg 2015.)

Another way to get even more broad audience is to share these virtual reality experiences online, in places like YouTube or make your own application for mobile devices so that even more people interested in traveling could see what they can book from you and this is what Finnish travel agency Aurinkomatkat has done. They launched their VR-application in biggest travel-related trade fair in Finland called "Matka" (Travel in English) in early 2016. They asked visitors to try their virtual reality-application and provided free branded Google Cardboards for the users willing to try the application. Another Nordic travel agency Tjareborg is sharing their 360-degree videos of their most prestigious locations

like Dubai on their Facebook and YouTube pages. These include videos about their hotel offerings and local sights and can be also viewed with VR-headset.

4.2 VR in real estate and spaces

One of the first implementers of virtual reality after adult entertainment and gaming was the real estate business. Virtual reality offers real estate businesses a lot of opportunities since it offers completely new way to design and showcase real estate plans and completed structures.

For business to consumer sales producing virtual reality content can provide rapid increase in sales. One of the hardest tasks for real estate agents is to get people to go and see an apartment or a house but with virtual reality they don't need to come and see the place but instead they can use their virtual reality headsets and go and see the tour whenever they are interested. Also, the use of the VR-headset is not mandatory since virtual reality videos can be viewed in 360-degree format from any device which support the platform one has used to upload the video. So basically, everybody who has access to Facebook or YouTube is your potential customer, so you can reach billions of people with your VR-content.

Many real estate companies have received positive results as they have started using virtual reality as part of their marketing activities. Not only will it allow you to showcase existing housing, but it will allow your audience to get familiar with your future projects which are still being built since with current technology it's possible to achieve almost real looking 3D models for virtual reality. Company Virtual Xperience builds 3D-models for their clients so that they can use virtual reality to showcase their upcoming property projects to their investors or buyers to start gaining revenue even before the building even starts. What makes it even more interesting that features Real Time Options, so you can change the colours, materials, furnishing and lighting conditions so that the possible buyers can get even more customized experience.

One of the great tools for VR-real estate marketing existing properties is Matterport 3D-camera and their applications for it. Matterport's 3D-camera allows you to take 360-degree photos and map the whole area for and accurate 3D-model. In addition to the accurate 3D-model the software also allows user to make 360-degree excursion throughout the property which is the most interesting feature for the real estate marketers and you can later turn this excursion to VR experience. According to the Matterport Director of Commercial Real Estate Marc Rehberger the time spent viewing the ad increases from

three to six times when there's a Matterport 3D-model on the real estate ad (Forbes 2017.). They also have the biggest VR library of the "Real World Places" according to their own website with over 250 000 spaces published to their CoreVR app designed for Google Cardboard and Daydream and Samsung Gear VR (Matterport 2016.). One the reasons for their growing popularity is the usability of their products and apps: you don't have to be software engineer to use them, just basic knowledge of computers and applications is fine.

Matterport is also collaborating with Finnish virtual reality company Vizor which has a strong focus on virtual reality. They created an VR-experience for WebVR and you can watch it even from your Facebook news feed. Just by using your mouse you can browse small part of the National Gallery in London or when using VR-headset it offers you full virtual reality experience. This is big thing for all the marketers who are using 360-degree photos as part of their marketing in Facebook since with this tool you can create 360-degree tour and even provide more details of the space by adding text to the tour. The best thing is that your audience doesn't even have to leave Facebook, but they can tour around the content without leaving their newsfeed.

This is how the experience looks in your Facebook newsfeed:

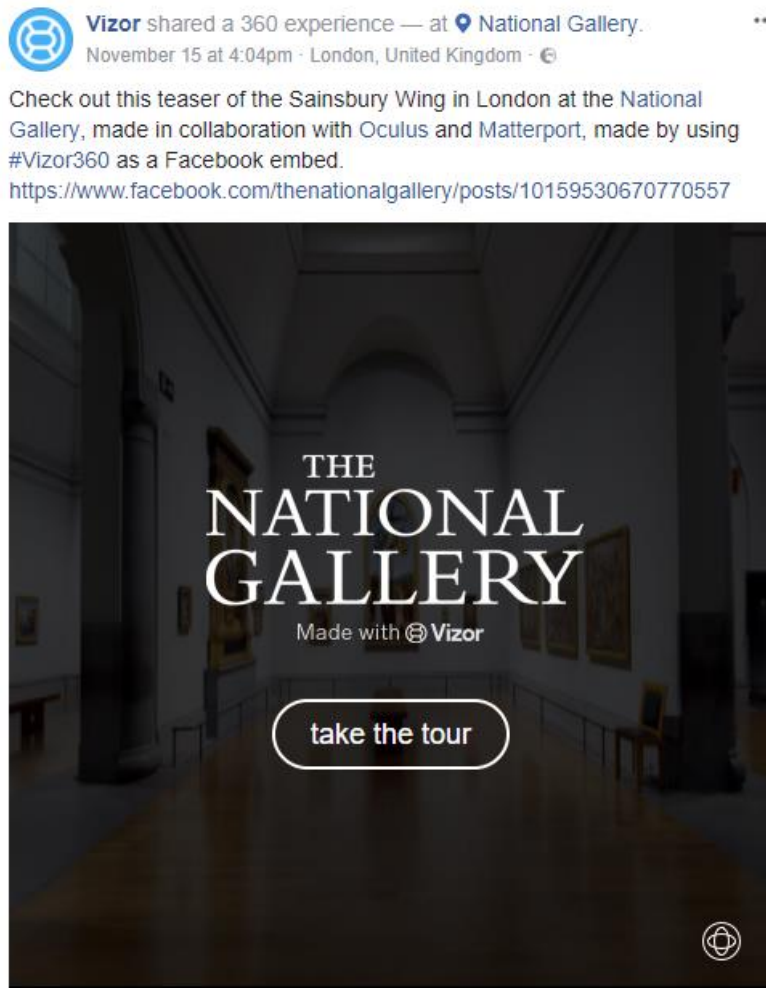


Figure 15. Vizer Facebook 360 experience (Vizer 2017)

And as seen from the photo you can also use virtual reality to not only market real estate but also other spaces like museums and shops or even shopping malls with the technology Matterport and its competitors provide.

4.3 Using virtual reality in event marketing

Event marketing is one of the most powerful ways to showcase your product or service to the audience which are already interested in the industry you're in. But event marketing also has another definition: it also means marketing an event you (or someone else) is organizing.

According to survey by Bizzabo, 80% of marketers think that event marketing is critical for their organization's success (Endless 2018.) so companies need to do something differ-

ently to stand out of the crowd. One of the effective ways marketers have found is by using virtual reality to promote their products and services in completely unique way or promoting events.

4.3.1 Using virtual reality at trade shows

Many companies have issues of displaying their products the proper way in the trade shows. If your product is something big it's hard to bring it to trade show. I've seen hotel rooms being built for trade show purposes but with virtual reality you can let people to wonder around your new resort and see the all types of rooms and services your hotel has to offer. Marriot hotel chain has promoted their locations at various trade shows with virtual reality since 2014.

But not only travel industry can benefit from using virtual reality at trade shows: Lenovo promoted their Unified Workspace at Gartner Symposium trade show. Gartner Symposium is where hundreds of top CIOs and IT executives from US come to search for new IT solutions for their companies. The year before they got approximately 80 leads, so they wanted to try something different and instead demoing their solution they decided to create an VR experience instead. They partnered with the company called Lucid Dream and according to their chief commercial officer Joshua Setzer "Virtual reality experiences tap into a different part of the brain that's used for extended memory, so it increases the chance of success in future follow up" (Lenovo Software 2017.) when compared to the traditional fair show marketing. Together they created first-person shooter game and set up six VR-headset stations for the people to try. People were lining to try the VR and over the course of 4 days, around 360 executives tried the VR-experience. They used the headsets for 15 minutes on average and with the debriefing of the experience they managed to get 30 minutes of attention from the top-level executives. According to the company statement to New York Times they managed to get three times more leads compared to the previous trade conferences (New York Times 2017.).

Another good example of what you can do in trade shows is the idea which Henrik Helin's company 360mediatalo got: They filmed street racing video in 360 and let their users to try how it feels like to be seated in a race car by building a race car frame and handing them VR headsets in which they could enjoy the race car video in VR. According to Henrik it was one of his favourite projects and got positive reactions from the crowd since the same video was also filmed in regular video format.

Easiest way to benefit from virtual reality at the trade shows is to focus on good quality content that can be represented in multiple events and outsource the production and rent virtual reality headset-setup with instructors for the trade show. Cost of the high-quality production would be somewhere between 50 000 – 100 000 USD but the prices are coming down and good content can be made with budgets under 10 000 USD like VR movies “I am because of you” shows us (UploadVR 2017). Companies like Marriot have their own customized virtual reality setup called “Teleporter” which has ability to add other experiences like wind on top of the virtual reality, so it feels even more realistic.

Many companies are also developing their own applications for virtual reality experiences and it is becoming as one of the ways to market your product or services. If you are interested in developing an application for mobile/VR-headsets you should also add at least 10 000 USD more for your budget in addition for the virtual reality production even though it can be made with cheaper budget, but the quality won't be as good. These applications should be well promoted at trade shows and you could give your audience free branded VR-headsets (like Google Cardboard) so they could use your application also at home and even let their friends and family try it, so it is best to focus in VR-apps for mobile devices.

4.3.2 Marketing an event with virtual reality

In the era of livestreaming and 5G-networks becoming reality rather than distant future it will be even more common to people use web communication instead of traveling and virtual reality will give us possibility to be present around the world from our office or home. This will create whole new audience for the events and allows event organizers to sell the same seat hundreds or even thousands of times without fear that the event will be sold out.

One of the first companies to organize event with the use of virtual reality was Chinese mobile device company called OnePlus which held their launch event for their new mobile phone in China but delivered free VR-headsets for limited number of fans and media and created free app for all the potential viewers to watch it in virtual reality. This was in 2015 and technology has taken huge steps since and viewers had option to watch livestreamed 360-videos with VR-headsets since April 2016 and Facebook introduced the same option in March 2017. There is also a lot of competition from big TV-companies and new companies for the rights to broadcasts events with 360-degree video/virtual reality and since more and more people are adapting to virtual reality we can see the competition just getting even more fierce. But what does all of this mean to a marketer?

Example A: Company X new model Y launch. Your company is luxury car manufacturer and you want to give your customers unique experiences with your cars. Why not create them one more unique experience with virtual reality: instead of spending hundreds of thousand dollars for various launch events you can invite them to watch the big launch event from their home/office or create local events with smaller budgets where the invited people could meet with each other and try virtual reality. They could see the live event in VR and virtually even drive the car before getting it delivered or available for a test drive. How?

Luxury car makers use CRM and pay attention for customer service, so the local and international sales personnel have good idea who to invite to this kind of event. They could send a package to their loyal customers with branded virtual reality headset and an invitation letter with the instructions for the VR-headset. They can then choose if they wish to attend from home or go to a local event. At home, they could watch the event live or when they have time with mobile app and if they decided to go to a local event, there would be more powerful VR-headset where you can “test drive” the new car model. You will probably also get media exposure since even though the virtual reality is gaining popularity, it is still quite new and exotic technology and people are interested about it. This could be applied for not only for luxury cars manufacturers but many other luxury product manufacturers in various industries.

Example B: Event organizer X wants to market their event ABC and sell tickets for virtual seats. Event organizer X wants to increase the sales of tickets their upcoming event and start selling tickets for virtual seats and as a marketer it is your job to get it done. Good way to do this is to add VR-ready videos to YouTube and Facebook so people can experiment the technology for free before paying for the seat and they can even get interested about buying actual ticket to the event. Another way is to have a mobile application for the event where people can watch rebroadcasts of the other events and buy tickets. But the bar to download an application is higher than watching video from your browser/existing app so the focus should be in there. VR-ready videos could include videos of other events and been filmed from the “best seats” available since virtual reality should bring something extra to the audience for them to use it. For example, one of the world’s leading business events, Nordic Business Forum is selling tickets for the virtual reality experience as part of their live stream service. Currently compatible with Samsung Gear VR, Oculus Rift and HTC Vive the prices start from 120 EUR + VAT compared to the traditional ticket which goes for 990 EUR + VAT (Nordic Business Forum 2018.) so it’s possible to make big savings by using the VR. As a marketer, it is important to understand how virtual reality will

affect events. It will increase the sales of the events since the price for attendance will be significantly lower: for example, courtside seats for NBA game for 20 USD instead of 10 000USD courtside tickets. Virtual reality will be also great way to gain media exposure for launch events.

4.4 Virtual Reality advertising

Using advertising for users who are using virtual reality headset is effective way to get your message sent to your audience. Since the person who is using virtual reality headset are fully immersed to the content they are seeing through the VR-headset. People who have tried virtual reality know that when you are using the VR-headset it is almost impossible to do other tasks than focus on the content since your view is blocked and you are listening the audio from the content. This means the user is less likely to have any distractions to perceive your message compared to the modern world where distractions are everywhere. Good example would be modern TV-ads since during the commercial break you can use your mobile phone, grab something to eat or go to the restroom. If person is using VR-headset, he or she needs to pause the content and take the headset off to do any of the things I mentioned above.

Virtual reality advertising is still not widely used and one of the few platforms that has made it possible is YouTube. In July 2015 Google announced 360-degree video ads for YouTube by using the TrueView advertising platform. TrueView is Google's platform for video advertising on YouTube. There are two types of TrueView ads: in-stream and video discovery. In-stream ads play during or before the video of one of the YouTube's partners. Every viewer must watch at least five seconds of the ad and only after that they can skip the ad or continue watching it. You only must pay when viewer watched the ad for 30 seconds (or till the end of the video if it's shorter than 30 seconds) or clicks through on a card or some other elements added to the ad. Video discovery works quite differently since they will advertise your video on the YouTube's search pages or together with other YouTube videos. It will be also showed to your target audience via Google Display Network and you will pay each time the user clicks on your ad. The 360-degree ads work on both Android and Apple via YouTube-app and when using YouTube with Chrome-web browser.

But how powerful can the 360-degree ads be? On their 360-degree ad release announcement they gave some promising numbers:

“...And for those videos that were run as ads, campaign results have been impressive: for instance, Coca-Cola’s 360 video celebrating the 100th anniversary of their iconic bottle design outperformed standard in-stream video ad view-through rates by 36%.” (Google Inside AdWords 2015.)

Google also made a study with outdoor equipment manufacturer Columbia Sportswear where they made two advertising videos: one in traditional format and one by using 360-degree video. They were focusing on classical metrics like view-through rates, viewer retention and for the 360-degree video they also measured the interaction rate which measures the amount of people using the 360-degree video by moving their phones or mouse around to see the full 360-degree picture. The videos were unlisted on YouTube meaning that only way for the audience to see the videos was to watch the in-stream ad or by sharing the ad to others. The idea of the campaign was to get the audience to watch the full-length advertisement video instead of the shorter 60 second one. Instead of the promising results of the Coca Cola campaign this campaign underperformed when compared to the traditional video when looking at the view-through rate. On the other hand, the 360-degree video had higher click-through rate. The interaction rate of the 360-degree video was also higher than its view-through rate meaning that the audience was interested in the new video features even though they didn’t finish watching the video. 360-degree ad also clearly outperformed traditional video ad on all the action metrics: views, shares and subscriptions. The full length 360-degree video also got 46% higher viewer count when compared to the traditional full-length ad and the 360-degree ad was also cheaper when they combined the organic and paid views together since the 360-degree ad was shared more. (Think with Google 2016b.)

In June 2017 Google also announced their new project about showing online ads in virtual reality and they are currently testing it in their Area 120 workshop (used by Google to test out new ideas by their employees). They would show this in VR apps so that the app developers would have another source of income instead of only selling their apps. The ad would be a small branded box which could open a small screen which would open a video ad when clicked or stared long enough. The project is still a prototype-phase. (Google Developers 2017.)

Another player for VR-advertising is game engine company Unity which is a major player in virtual reality development. They have taken little bit different approach to the ads in VR. Instead of passively watching the ads the audience will have the chance to play with them in virtual reality. Called “Virtual Rooms” the audience can enter to the ad through “glowing door” and will enter totally different experience and can explore the ad from 30 to

60 seconds, depending on the activity of the user. Currently they are testing the “Virtual Rooms” with the movie company Lionsgate to promote new film “Jigsaw”. They offer the experience in two channels: first one is the Samsung Internet VR (Internet browser for Gear VR) and the second is Spiraloid’s Nanite Fulcrum (VR graphic novel which is available for both Gear VR and Oculus Rift).

Third big company starting to use VR advertising is Hulu, an American subscription on demand service which is owned by the big film companies like Walt Disney and 21st Century Fox amongst others. Hulu has taken a bit different approach to advertising compared to its competitors: they offer their advertisers to implement their ads to virtual reality series or focus on specific occasions like the premiers. They have two advertisers to sponsor their new VR-series “Door No. 1” and the users can choose how the story continues. Partnered with Nissan and dating-app Bumble, they will see these brands while watching the content. The VP of integrated marketing at, Hulu Nicole Sabatini says: “It’s a unique opportunity to reach a very specific type of audience – a more influential audience that is looking to try the newest content experiences”.

5 Conclusions

Virtual reality has the chance to really change the game when it comes to marketing. While social media and digital marketing are gaining more and more popularity, some companies are trying to come up with new ways to attract audience and virtual reality is one of the best ways to do it.

This chapter will conclude all the important topics together and answers to the main questions of this research: how marketers can use virtual reality and what kind of technology is there for them to use.

5.1 Virtual reality headsets

Virtual reality headset market is controlled mainly by three big names: Oculus (owned by Facebook), HTC Vive and Google. Microsoft has also entered the VR headset market with their stationary “mixed reality” headsets which were produced by companies like Samsung, Lenovo and Dell amongst other top tier computer manufacturers. One of the reasons for the tech giants entering the market is not only to get a slice of the cake of the VR hardware sales but also gain more sales from their software stores like Windows store, Googles Daydream platform or Oculus store.

The VR headsets can be currently divided in three different categories: mobile VR headsets, stationary VR headsets and standalone VR headsets. In the future there might be more categories like “mixed reality” headsets which combine both virtual and augmented reality together in one headset and that is what Microsoft is currently working on with their partners.

Mobile VR is currently the most popular of the all three which can be seen from the Figure 4 (VR Headset sales in 2016). The most popular mobile VR headset is Google Cardboard and products based after its design. The reason for it being so popular is its price point: you can buy it or its copy for less than 10 USD and giving them away as part of VR experience is one of the marketing tactiques used by some companies. The main use for Google Cardboard is for watching 360-degree videos or accessing some basic VR content since it doesn't ship with controller so for example gaming is quite difficult. The second reason for that is that it doesn't have designated app-store for virtual reality apps and games. The second most popular headset is Samsung Gear VR which is made by partnership with Oculus. The reason for it being so popular is because of the bundle deal Samsung offered worldwide: when buying new Samsung flagship phone (all S6/S7/S8

and Note 8) you could also get free Samsung Gear VR package with headset and controller. Compared to the Cardboard, Gear VR has much better building quality and it comes with remote and designated Oculus app-store for plenty VR experiences. It works only with new high-end Samsung phones. Third popular mobile VR headset is Googles Daydream. It is Googles response for Samsung Gear VR and offers good building quality and ships with a controller. The main difference to Gear VR is that Daydream uses Google's own Daydream app store and works with multiple phones, not only Samsung.

For the stationary VR headsets, the market leader is currently PlayStation. Compared to its main competitors Vive and Rift it wins its market share by low price point and by the fact that you don't need to upgrade your PC, you can just plug the VR headset into your PlayStation 4 and you are ready to go. The fact that they have a lot of exclusive games and that the gamers are more likely to try new technology has also helped them to boost their sales. The second and third are HTC Vive and Oculus Rift which were released in 2016. Compared to the PlayStation VR, for using HTC Vive or Oculus Rift you need high end PC which can run VR apps and games but also offer slightly better performance over PS VR. One of their main differences are the app stores: HTC Vive uses Viveport and Steam and Oculus on the other hand also has partnered with Steam and offers their own Oculus store for the users of their Oculus Rift. Newcomer for the stationary VR market was Microsoft and its partners. Again, the main difference is the app store since Microsoft offers their apps through their Microsoft Store. But Microsoft is focusing the development of their VR headsets towards creating mixed reality experiences in the future. Also, Microsoft's headsets don't require external sensors for tracking movement compared to Rift and Vive.

According to the interview with Olli Sinerma the future of the virtual reality lies in standalone VR and the year 2018 is the year when many of the headset manufacturers are launching their first standalone headsets. Compared to the stationary VR headsets the main difference is that you don't need to have powerful PC anymore and you get rid of all the wires you needed to plug to your headset from your PC to power it. The most important standalone headsets are the Vive Focus VR and Lenovo Mirage Solo since they are the first standalone headsets to offer six degrees of freedom movement. Again, the main difference are the app stores since Vive works with their own Viveport and Steam and Lenovo uses Googles Daydream store. Third important standalone headset is Oculus Go which will not have six degrees of freedom movement tracking and has lower tier specs but is going to be lot cheaper with the price of 199 USD.

5.2 How to apply virtual reality to your marketing

Using virtual reality as part of your marketing portfolio is not an easy task since it takes a lot of effort, time and money. But the rewards are also high since according to the Googles research Coca-Cola got 36% better view through rates when they ran their ads in 360-degree format compared to the traditional video ad. There are also a lot of other studies backing that virtual reality can be important piece of marketing like the Lenovo case in which they let the top level executives to try VR themselves at a trade show and Lenovo got three times more leads and more one-on-one time with the persons trying the VR.

One of the industries which could benefit most from using virtual reality is the travel industry. Important part of marketing in travel industry is the visual content: people who watched a video ad about the city were 23 times more likely to book a stay in that city. Another study by TripAdvisor shows that 73% of travellers use photos to make booking decisions. This research was based on normal photos in 2013 when the photos were not so common but now this could be considered as extra engagement if the hotel would have 360-degree photos or videos posted on their TripAdvisor-page or website. For marketing travel locations with VR is the cooperation: showcasing multiple businesses and attractions on one video or VR experience makes more interesting content but also allows smaller businesses to participate by the possibility of splitting the costs since VR experiences are quite expensive and high-quality productions can cost anything between 50 to 100 000 USD. For accommodation marketing virtual reality can be extremely powerful since it allows you to showcase the whole room in one photo and 3D tours of hotels are getting more popular and many of the biggest players are already starting to realize the power of VR by launching their 360-degree or full VR experiences. The biggest names in hotel industry like Airbnb, Best Western, Hilton and Marriot are already using virtual reality as part of their marketing. Also, the travel agencies can use virtual reality and good example of that is one of the biggest leisure travel agencies, Thomas Cook. They added VR headsets to their flagship stores and let their customers “travel” to their locations around the world. This resulted 40% ROI and they also got media exposure from big media houses. Another way for agencies is to create their own app like Finnish leisure travel agency Aurinkomatkat did: they created VR app for smartphones which allows you to “travel” to some of their locations and marketed it at the biggest travel fair in Finland by handing out branded Google Cardboard headsets if person downloaded the app.

Virtual reality is not only good for showcasing hotels but also other properties and spaces. Since VR gives new perspective of the property to the user, it is already being used by many of the top real estate companies in US. Virtual reality allows users to experience the

properties like they never had before and opens other possibilities for the seller: property tours can be now accessed virtually 24/7 and anywhere around the world with just a smartphone and internet connection. Real estate developers can also create accurate 3D-models for VR and by that customer gets even more accurate view of how the property will look when its ready. Their customers can even change how the interior looks by designing the interior by themselves with designated VR-app. This makes it easier for the developers to sell future projects to the investors and potential buyers and gain revenue even before the building process starts. Company Matterport has come up with 3D camera which takes high quality 360-degree photos and transforms them into a virtual tour. What makes the camera and its app so special is that it also can make accurate 3D-model of the space and these tours can be also made into a VR-experience without any postprocessing through their app. Matterport's CoreVR app also hosts biggest "VR-library" of real world places with over 250 000 VR-spaces listed. Matterport is working with Finnish VR-company Vizor and they are trying to embed virtual tours to Facebook so you could access the tour without even leaving your Facebook newsfeed.

Around 80% of marketers think that event marketing is crucial for their business, so it is important to attract attention in new ways. Virtual reality can be one of those tools as Lenovo has noticed: at Gartner Symposium trade show they managed to get three times more leads compared to the previous year by using virtual reality. To gain this kind of result marketers need to rent or buy VR headsets and buy VR production from a company which provides VR content and present it to the crowd. Another way to shine at trade shows is to make an VR app and promote it during the trade show and handing branded VR headsets like Google Cardboard to the people who download the app. For event marketing virtual reality is extremely valuable: if your audience has a smartphone with fast internet connection and VR headset they can access your event from all around the world if you just invite them. One of the first companies to do so was Chinese mobile device company OnePlus which livestreamed their product launch in VR on YouTube. Before the stream they sent Google Cardboards to the limited number of registered persons around the world, so they could watch it in VR. This kind of marketing tactics could be implemented for launch events or even educational type of events. One of the biggest business conferences in Europe, Nordic Business Forum, is already selling tickets to the live stream which can be also accessed with Virtual Reality headsets for more immersive experience. You can also buy tickets to watch NBA games from the front row seats along many other sports events so there is huge potential for virtual reality event streaming, especially when the 5G networks start working and offer us faster network speeds.

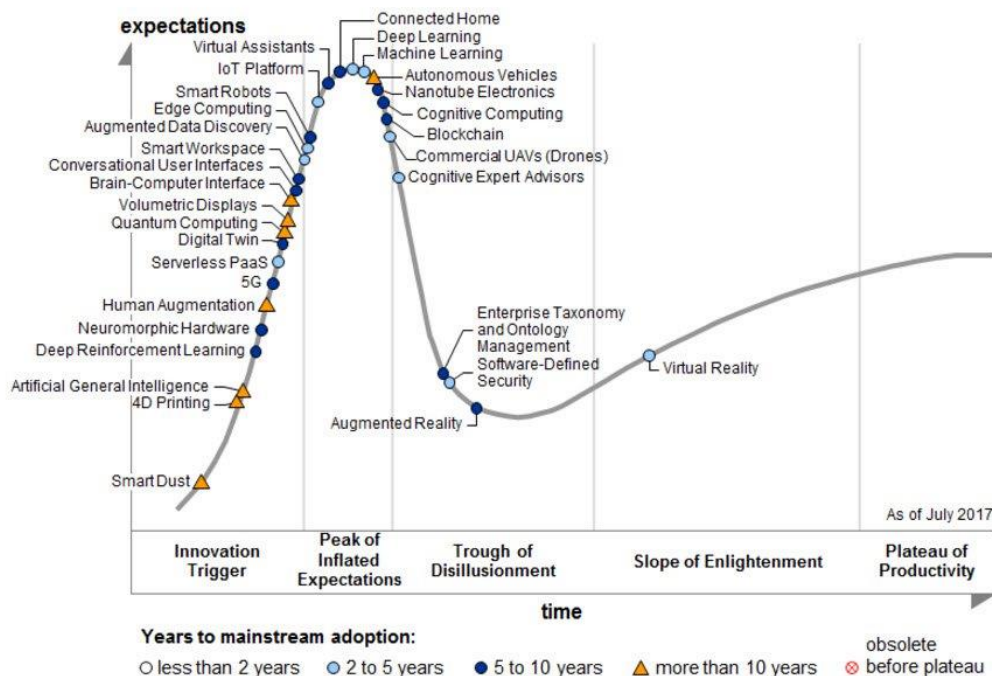
The advertising business is searching new platforms and VR future potential is looking

quite promising. What makes virtual reality advertising so interesting is that the user is immersed to the content and can't really be distracted from the advert and makes adverts more impactful compared to traditional adverts. YouTube was the first big social media platform to launch 360-degree videos as part of their media library in 2015 and companies like Coca-Cola and Columbia have used 360-degree video advertising with good results like +36% increase of view-through rates. In June 2017 Google announced their new project for advertising in VR platform. The main objective for showing ads in VR is to give developers another source of revenue and by that making Google's VR platforms more attractive for the developers. The project is currently on prototype-phase, but the ads would be shown as small branded boxes and when stared or clicked the box would open video ad. But Google is not the only company interested in VR advertising: Game engine company Unity is also big name in VR development and they have come up with their own solution for VR ads. "Virtual Rooms" is different approach from the Google since instead of showing a branded box the user is shown a "glowing door" and if they decide to interact with it they are taken to completely different experience (which is the ad). Unity is currently working with companies like movie company Lionsgate and Samsung for testing the ads. Third name in the VR advertising is the US-based streaming company Hulu. They have their own VR-series where the user chooses how the story goes further. The series is sponsored by Nissan and dating app Bumble and they get their brands shown to very specific crowd since the VR users can be considered as early adaptors for new technologies.

6 The future of virtual reality

Virtual reality has overcome its hype-phase and according to the Gartner hype cycle for emerging technologies it is already on its way to become mainstream product.

Hype Cycle for Emerging Technologies, 2017



Note: PaaS = platform as a service; UAVs = unmanned aerial vehicles

Source: Gartner (July 2017)

Figure 16. Gartner Top Trends in the Gartner Hype Cycle for Emerging Technologies, 2017 (Gartner 2017.)

According to the Gartner it should take 2 to 5 years for virtual reality to gain its so-called “plateau of productivity”. According to the Gartner the term “plateau of productivity” means “Mainstream adoption starts to take off. Criteria for assessing provider viability are more clearly defined. The technology's broad market applicability and relevance are clearly paying off”. (Gartner 2018.)

The next big steps for the virtual reality to gain more and more popularity is the development of the quality and ease-of-use. In the interview with Henrik Helin he mentions that the biggest obstacle for mass adaption of VR is the lack of the VR headsets. (Helin 17.11.2017.)

The biggest players on the market have already launched their first editions of wireless headsets but some of them are still not as powerful as their wired competitors. That will

change in the future and according to FIVR Chairman Olli Sinerma the wireless versions will totally replace wired ones quite soon.

Second problem lies with the image quality: there just are not enough pixels in the screens. The quality is already good but for the human eye to see the footage in real-life quality you would need a screen which provides over 2000 pixels per inch (PPI) per eye (Wired 2017.). For comparison, Oculus Rift provides you with screen of 441 PPI per eye and HTC Vive with 447 PPI per eye. Finnish company Varjo is tackling this issue with their own VR-headset which should be able to provide astonishing 3000 PPI per eye. They are still in early development phase but as you can see from the photo the results are astonishing when compared to VR-headsets like HTC VIVE or Oculus Rift:



Figure 17. Varjo Bionic display comparison images 2018 (Varjo 2018)

On the top photo you can clearly see all the buttons and texts compare to the current flag-ships. This is especially important when it comes to professional usage of the virtual reality: in the example they have provided you with view of the cockpit, but this can be implemented to various fields of training which benefit from the humanlike PPI. This kind of

technology comes also with a hefty price tag: According to Varjo CMO the price of the headset will be between 5 000 to 10 000 USD and they are focusing on the enterprise market (RoadtoVR 2018b). There definitely is some interest for a VR-headset with high PPI since company announced some of their development partners which contained companies like 20th Century Fox, Airbus and Volkswagen among others. They have also partnered with both AMD and NVIDIA on the hardware side (AnandTech 2017). If the company is successful with their product and can start large-scale manufacturing of the headsets we will probably see the increase of PPI in consumer devices as well. There has been also some news about other VR-headsets coming to compete with Varjo but so far there have only been some rumours.

Other solution for the better image quality lies in eye-tracking. Companies like Google, Apple and Oculus (owned by Facebook) have bought their own eye tracking companies and one of the reasons might be adding the eye tracking software to our household electronics and to virtual reality headsets, too. Swedish company Tobii one is the leading eye tracking development companies and is now working on implementing eye tracking to virtual reality headsets. Company has already showcased their skills with eye tracking by adding support for eye tracking in Windows 10. Now the company is working with together with Qualcomm and adding eye tracking to Qualcomm's next standalone VR-headset. (Wired 2018.)

One of the reasons of eye-tracking being so important is the technology called "foveated rendering" which according to VRFocus is: "Foveated rendering is a technique that tracks where the user is looking and only renders the area they are looking directly at in full detail, with everything else being blurred. This has been mostly aimed at reducing the amount of system resources needed to create VR worlds in realistic detail, but also has potential elsewhere". (VRFocus 2017.)

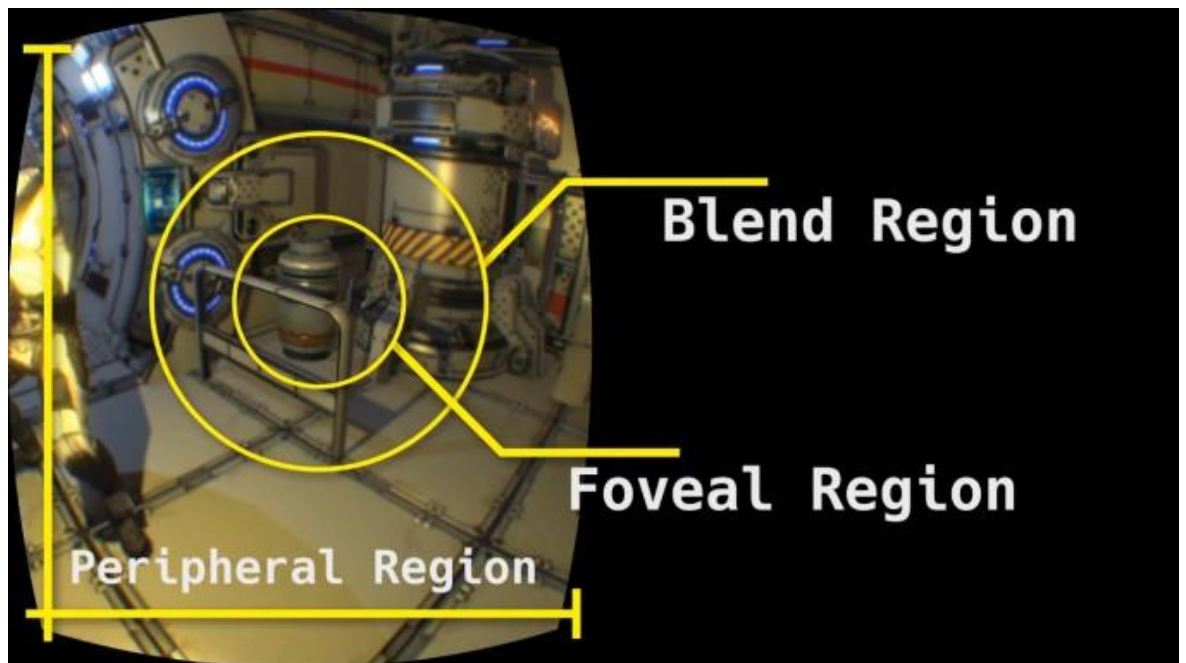


Figure 18. Foveal Rendering explanation (VRFocus 2017)

According to Tobii foveated rendering also increases the battery life amongst other things: “By understanding where you are looking, HMDs can direct high-definition graphics processing power to that exact spot in real time. This enables higher definition displays, more efficient devices, longer battery life, or increased mobility”. (Tobii 2018.) Foveated rendering does not only improve the image quality but also makes the lower spec devices able to run virtual reality content. According to the demo shown to Engadget foveated rendering was able to improve the framerate on low tier PC from 45 frames per second (FPS) to 90FPS. (Engadget 2017.)

Another important aspect of eye tracking is the interaction in virtual reality. The interfaces are mostly gaze or controller-based and for interaction you need to look to right direction, gaze or use your controller to point it and then choose the action. Eye tracking combines the first two phases together which makes interactions slightly faster and easier.

For the marketers the most interesting detail about eye tracking is its possibilities for collecting data & analytics. Eye tracking would give developers important data about possible improvements, but tracking could be also used as marketing research tool. Marketers would have the possibility to test out many of their products before the release in virtual reality environment and get data on what draws people’s attention, and which details they are focusing into. People might not even remember that their gazes are being tracked so the results would be more realistic compared to the cases where the test

subject would be handed a pair of eye tracking glasses and they might not act as natural.

The biggest concern for eye tracking and its analytics will be privacy issues. According to the Tobii's president of consumer business unit, Oscar Werner, privacy is their priority. The only info they share with developers is the gaze direction. "We do not allow applications to store or transfer eye-tracking data or aggregate over multiple users. It's not storable, and it doesn't leave the device" Werner says (Wired 2018) .Tobii is also working with researchers and allows them to gather analytical data but to do so they must ask for the users' permission.

Also the forecasts for VR, MR (Mixed reality) and AR (Augmented Reality) headset sales looks quite promising which can be seen from the figure below:

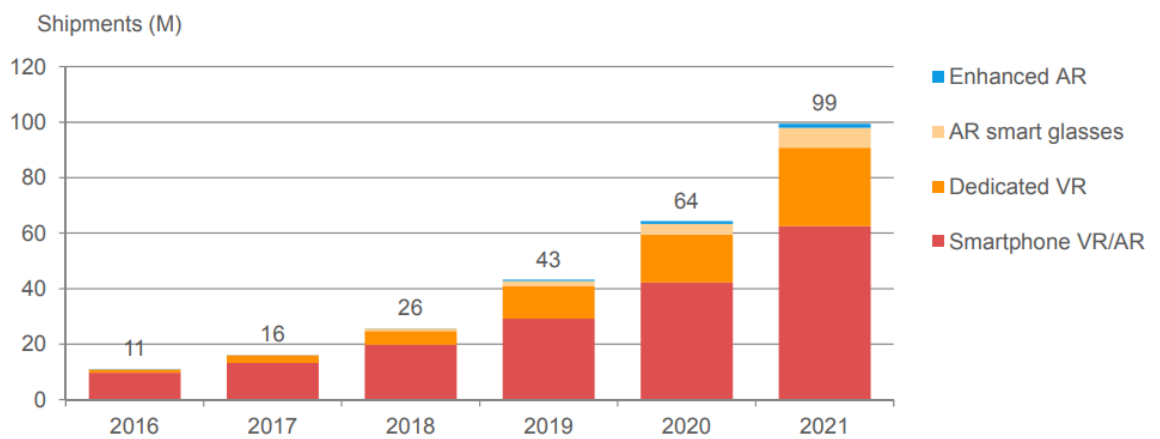


Figure 19. Shipment of VR and AR devices by category, 2016-2021 (Capacitymedia 2017)

According to analyst company CCS Insight we will see big increase of the shipments VR and AR headsets in the future and the largest part for it goes for the mobile VR and AR. It is also interesting to see that the dedicated VR (meaning PC connected and standalone headsets) will also start to gain more popularity in the future (Capacitymedia 2017). The popularity of the mobile VR and AR can be explained by the fact that there are above 2 billion smartphone users (Statista 2016b.) and most of them can access to VR/AR by just downloading application instead of buying expensive standalone headsets or top tier PC's. When the technology will get cheaper more people will adapt and that is also one of the reasons that the dedicated VR will gain more popularity since the headsets will be cheaper in the future.

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8 Appendices

8.1 Appendix 1. Interview questions for Olli Sinerma

1. Could you please introduce yourself? (Your name, company and how did you end up to the VR-field)
2. Could you tell me more about your company/association? (What it does and how did you end up starting your own business related to the VR-field)
3. How do you see VR in Finland and how about in the rest of the world? (What's special about Finland, are we a lot behind or?)
4. Do you think students should be educated about VR? Why?
5. Could you give me some examples about some of the VR success stories from Finland? What made them successful?
6. What about VR-marketing in Finland? (Are there many companies in that field?) How about around the world?
7. Have you seen VR-used in marketing in Finland? How about in other countries? Do you have some examples?
8. How you think we could improve VR-marketing?
9. And how could the VR-companies improve their sales and marketing?
10. How FIVR is helping Finnish VR companies?
11. The future: How you see VR positioning in Finland and internationally? What kind of VR tech will be adopted by the people? (Next five years?)
12. Other questions?

8.2 Appendix 2. Interview Questions for Henrik Helin

1. Could you please introduce yourself? (Your name, company and how did you end up to the VR-field)
2. Could you tell me more about your company/association? (What it does and how did you end up starting your own business related to the VR-field)
3. How do you see VR in Finland and how about in the rest of the world? (What's special about Finland, are we a lot behind or?)
4. Do you think students should be educated about VR? Why?
5. What did make you to get into the VR marketing field? Are you the only/first one in Finland?
6. From what does the normal day at the field consist of?
7. For what kind of content does the VR filming best suit for? (You can also mention your favorite project)
8. Does the lacking tech make you some problems? (low resolution and FPS, big equipment) Is it much different from making normal films?
9. Clients? What kind of clients are interested about the VR-videos? Do you have to train your potential clients about VR before reaching an agreement? Is there lot of hype about VR-videos?
10. The future: How you see VR positioning in Finland and internationally? What kind of VR tech will be adopted by the people? (Next five years?)
11. Other questions?