**FACULTY OF SOCIAL SCIENCES,
NORWEGIAN SCHOOL OF HOTEL MANAGEMENT**

MASTER'S THESIS

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TITLE: WHY IS THE VR/AR INDUSTRY NOT PERFORMING AS WELL AS FORECASTED WITHIN THE NORWEGIAN MARKET? 	

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Why is the VR/AR industry not performing as well as forecasted within the Norwegian

market?

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Abstract

Virtual Reality and Augmented Reality are currently facing some challenges becoming

popularized enough to be a household device in the Norwegian market. Since the big

breakthroughs in 2015-2016 it has been well known that the VR-industry was a tool for the

future across multiple industries. This study aims to determine if there even exists a

performance problem, and if it exists, which factors are contributing to holding the

VR-industry back from being a general household device.

To acquire data for the study, a qualitative and a quantitative method of study was used. The

data was then compared, highlighting the main differences and the similarities in the

responses. The similarities were then classified as insights. These insights were used to prove

the hypotheses true or false. The results indicated that there did exist a performance issue,

and that VR-technology specifically did not perform according to the expectation of the

general consumer.

The results suggest that the purchasing price of the devices, combined with little possibilities

of trying a device before purchasing were the main barriers, and the main challenges that

VR-faced within the Norwegian market. The results also suggest that the companies creating

these devices would benefit from expanding/improving their software related to other

industries where the consumer viewed VR-technology as a tool, such as education, work and

entertainment.

The results showed that Augmented Reality was not as popular as VR, but that there was

some evidence showing that if Virtual Reality grows, so will Augmented Reality.

Keywords: Virtual Reality, Augmented Reality, Pricing, Norwegian market

Foreword

This Master's Thesis was completed at the faculty of social sciences at the Norwegian School of Hotel Management at the University of Stavanger.

This thesis has enabled me to investigate a phenomenon that I am personally very interested in. During my two-year period studying Service Leadership in International Business I have been fortunate to meet new and exciting people, and professors that have been very helpful in providing me with the knowledge and skills to conduct a study worthy of a Master Thesis. I want to say thank you to my course teachers at the faculty of social sciences at the Norwegian School of Hotel Management at UiS.

I would like to express a special gratitude towards my student-advisor Truls Engstrøm. Your expertise and skills have been of incredible value during this long, but incredibly exciting process.

Last, but definitely not least, I would love to express my hearty gratitude towards my closest friends, and especially my family, who have been motivating and very helpful during this period. This would have been an incredibly difficult journey without you!

Stavanger, June 2022.

Sincerely, Jørgen Vier.

List of Abbreviations

VR - Virtual Reality

AR - Augmented Reality

MR - Mixed Reality

HMD - Head Mounted Device

WOM - Word-of-mouth (Marketing term)

Introduction

The Virtual Reality and the Augmented Reality industry has been something that has been known to the world as "up-and-coming" for what feels like a couple of years now, but we still do not see the results that we might have expected the first time we heard about it. Why is that?

There have been multiple reports and news-articles talking about how VR will become a standard household device and be used in different settings such as in gaming/entertainment, work setting or even in education. There have also been reports that VR is growing by over 100% every year, year after year, but we still don't see the VR-devices as a standard household device, at least not within the Norwegian market. Will it ever happen, and if so, how long will it take?

This thesis begins by first presenting some background theory and the history of VR/AR, before it transitions into a study that gives a small insight to the near future of VR. This thesis aims to shed some light into which factors are functioning as barriers that are currently preventing VR-devices from becoming standard household devices in Norwegian homes.

The questions that naturally arises when we see reports like this is: where are the results? Where is this fantastic tool that we keep hearing so much about? And where is it now compared to the first time we heard about it? These questions can be boiled down to a single research question: Why is the VR/AR industry not performing as well as forecasted within the Norwegian market?

Literature Review

Theory

What is Virtual Reality and Augmented Reality?

As VR, AR are technological terms, it might be important to clarify what VR and AR is, as well as the main differences that distinguish the two.

Virtual Reality, also known as "VR" is a complete immersion experience that completely shuts out the physical world. Using a HeadMounted Device, or HMD such as the Oculus Rift, HTC Vive or Google Cardboard. These glasses usually cover eyes and ears, and paired with controllers in each hand this "transports" the user into a separate universe of imagined environments. (Gupton & Kiger, 2021)

Augmented Reality, also known as "AR", is a simpler version of VR. AR adds a digital element to a live view, and could simply be done by a smartphone, or with a separate device. Pokemon Go, as well as many Snapchat filters use AR technology. (Gupton & Kiger, 2021).

The history of VR technology

According to Dom Barnard at Virtualspeech, in a blogpost from 2019 they published a great overview of the broad history of VR. Apparently VR technology today was built upon ideas that dates all the way back to 1838, where Sir Charles Wheatstone was the first person to describe Stereopsis, using twin mirrors to project one singular image. The theory that VR is built on today. He was awarded the Royal Medal of the Royal Society in 1940 for his

explanation of binocular vision, and this led to the construction of the Stereoscope, the most important building block for VR technology. (Barnard, 2019)

The first HMD, or the "VR headset" as is the general term today, was invented in 1968 by Ivan Sutherland and his student Bob Sproull, however the term of "Virtual Reality" was popularized until 1985. (Barnard 2019)

In 1985, Jaron Lanier and Thomas Zimmerman established VPL Research. VPL Research is known for being the first company in history to sell VR goggles and VR gloves as we know it today. This led to the development of several exciting uses for the VR technology. (Barnard, 2019)

In 1986, Thomas Furness developed a flight simulator known as the Super Cockpit, containing several advanced features such as 3D maps, infrared and radar. The Pilot was also able to see and hear in real time. (Barnard, 2019)

In 1989 Scott Foster received a contract from NASA to develop a VR-training simulator for astronauts, the VIEW program ("Franklin Institute", N.D). This was further developed into a pretty advanced program in 1991. The same year SEGA Games announced they were working on the SEGA VR headset that would be available for the general public, it was launched in 1994. (Barnard, 2019)

Nintendo picked up on the VR trend in 1995, and the VR technology experienced rapid growth with the launch of Google Street View in 2007, the Oculus VR company

(META) was acquired by Facebook in 2014. Following this was an even more rapid growth, with new innovations and projects being launched fairly regularly. (Barnard, 2019)

The principles and the building blocks for what VR is today have been around for some time now, but it took time to puzzle the pieces together to create the experiences that VR offers today.

The history of AR technology

In an article by Interaction Design, the history of AR was discussed. AR was first achieved in 1957, when cinematographer Morten Heilig invented the Sensorama. The Sensorama delivered visuals, sound, vibration and smell to its viewer.

In 1968, Ivan Sutherland invented the HMD, which also impacted the AR technology, but AR did not develop to a functional AR system until 1992, when Louis Rosenberg created Virtual Fixtures. Virtual Fixtures was a complex robotic system which was designed to compensate for the lack of high speed processing power in the early 90s. (Interaction-Design, 2021)

The most noteworthy breakthroughs for AR technology are:

- Bruce Thomas and his AR game called ARQuake in 2000.
- ARToolkit, a design tool that was made available in Adobe Flash in 2009.
- Google Glasses that launched in 2013.
- Microsoft launched AR support and the AR headset HoloLens in 2015.

Industry Analysis & Trends

Sales history and prognosis

According to a report from Deloitte from 2016, they call the virtual reality industry "a billion dollar niche". Sales were at about $700 million in hardware, with an estimated sale of 2,5 million VR-devices and 10 million game copies sold. Comparing these numbers to the sales of the Sony Playstation 4, which launched late 2013. According to the Video Game Sales Wiki, The Playstation 4 console had by January 3rd, 2016, sold 35,9 million devices worldwide, and by January 1st, 2017 the sales had reached 53,4 million. This gives a yearly increase in sales of approximately 17,5 million consoles nearly three years after its release. In comparison to the numbers of VR-devices sold, one could say that the sales had been somewhat lackluster.

BBC published an article on the 1st of January 2016, titled "2016: The year when VR goes from virtual to reality". And reasoned the belief that VR was going to be a reality in many homes by the year of 2016 with massive investments from Facebook, Sony and HTC into the VR industry.

However, things are now looking brighter for the VR industry, with the market growing almost 100% year-over-year, with the Oculus Quest 2/Meta Quest 2 capturing 78% of all AR/VR
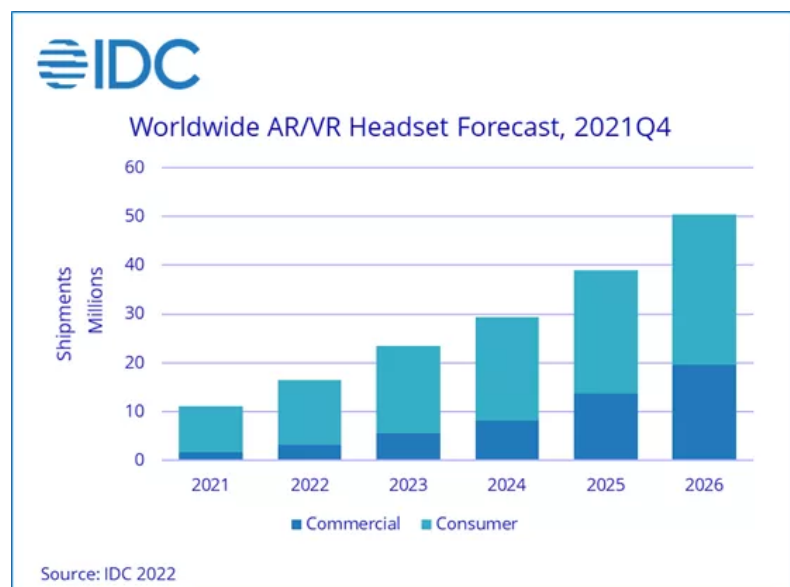
headset sales in 202 according to Android Central.

These numbers are expected to grow continuously as the purchasing trend has had similar growth for the past few years, with sales exceeding 16 million devices by the end of 2022 according to a report from the International Data Corporation (IDC) from 2022.

2021 was a big year for VR, with sales jumping by approximately 7 million units. However, 2022 is expected to have a lot in store for the VR industry according to Program-Ace. one of the biggest VR blogs in the world. With expected increases in enterprise applications, a greater user adoption, hardware improvements, easier development and more VR-tailored services, it is expected to generate more users.

To add to this list, the Meta-Project has been in development for a few months and has lost more than $10 billion in 2021 (Kovach, S. 2022) Following this, META stock prices were plummeting after the release of the financials of the 4th quarter of 2021, and with META's CFO announcing that they expect the operating losses to "increase meaningfully" in 2022 according to an article from the CNBC. However, building the Metaverse isn't cheap, and losses in the development stage of a project this size is to be expected.

User Demographics

As VR/AR technology is still a relatively new technology, especially since as late as 2016 was the year that many of the high-quality VR-headsets were released for commercial use.

According to a study from GlobalData from 2016, Gen Y, or the millennial generation are generally more open to experimenting with new products, and are more open to new and innovative concepts. However, Ages 40-60 (Gen X) are almost as open as Gen Y. The study

finds that this trend declines with age, so the general takeaway of this study is that young people are more open to trying new products.

In Norway specifically, in a study performed in 2021 by Kjetil Raaen and Ragnhild Eg, two professors at Kristiania University College, with the help of Kantar found that the extent of which VR has been accepted in the Norwegian market is very unclear. In a study with 936 respondents, merely 20% of the respondents had ever tried VR, and 0,6% of them used it every week. The exact sales numbers for the Norwegian market specifically were not published anywhere. However, seeing this level of adoption indicates that the sales within the Norwegian market are not considered very solid.

Another interesting find was that even though only 11% had never heard of VR, over 60% of their respondents that had ever tried VR, had only used it for less than 15 minutes in total.
Overall, the user demographics for men and women are fairly similar, nearly 70% of the male respondents had never tried VR, and a little over 20% had tried it. Nearly 80% of women had never tried VR previously, while a little less than 20% had. The remaining respondents had not tried VR, but had the desire to try it.

Furthermore, the amount of users that had never tried VR increased dramatically with age. In the age group of 29 and below, nearly 50% have never tried VR, but 45% of the respondents had tried it. In the age group of 30-44 years old, over 50% had never tried VR, but only 40% had tried it, this trend continues as age increases. In the age group of 60 and above, nearly 90% had never tried VR, and less than 10% had tried it.

It is therefore not that big of a surprise that typically, people aged 16-34 are those who are more likely to use Virtual Reality technology, 34% of users between 16-24 and 35% between the ages 25-34 use VR. However this number could be influenced by consumer purchasing power, as people in the ages 25-34 have a higher purchasing power than people aged 16-24. Only 6% of people older than 55 are users of the VR technology according to 99firms that have conducted a study on Virtual Reality demographics.

In an article called "Barriers to VR use in HE" by Leighton Evans, it was argued that price of consumer VR was explicitly linked to the viability of the VR industry" And the argument was that the price was too high for the consumer and therefore acted as the main barrier for mass consumption of VR.

To summarize, there is evidence that VR is still a relatively new concept, with the biggest launches of devices as late as 2016. Also, there is existing evidence that young people are more open to trying new products coming to market. Lastly, there is existing evidence that a significant amount of young people have tried VR, and that the amount of people that have never tried VR increases dramatically with age.

Future prospects for VR and AR technology

The "META" Project

In 2019, The Chan Zuckerberg initiative, a foundation founded by Co-founder of Facebook and META, Mark Zuckerberg and his wife, made the META Project public. Stating that "Meta is a biomedical research discovery tool that analyzes & connects millions of scientific outputs to give you a "comprehensive view into science"". (Gonzalez, 2021) And in 2021, META CEO Mark Zuckerberg announced that the META-project was in development.

On the 28th of October 2021. META published a video on the famous media platform YouTube, titled "The Metaverse and How We'll Build It Together – Connect 2021". In this video, Zuckerberg is seen walking around in the "Metaverse", whilst talking about what the intention of the Metaverse is, and what one can expect to do in it. He talks about seven different aspects of life and how the META-project is approaching these different aspects:

Social Connections:

META believes that the Metaverse will be the successor to the mobile internet. The goal is for the users to have a sincere feeling of presence, and not simply looking at a grid of faces on a screen. Sending pictures, playing with friends, having meetings, the goal is for the user to be in these experiences, making it more natural and vivid. Users will be able to create their own different Avatars, and not just simply human forms. And allowing them to meet and communicate in public or private server spaces. (Meta, 2021)

Entertainment:

Using these same Avatars, one would be able to join friends on concerts from remote positions all over the world. Afterparties, clubs and city life can be richer than previously. Additionally META is working on being able to implement physical devices into the Metaverse, such as for example instruments. Creators will also be able to join in on Tours, scavenger hunts, and shopping on the digital marketplace. (Meta, 2021)

Gaming:

The biggest entertainment industry is gaming. Allowing for old games being played in a new way. Investing more towards the development of VR-games is something that Zuckerberg expressively talks about in the video. (Meta, 2021)

Fitness:

The VR device Oculus Quest that already exists on the marketplace is used for fitness right now. But META is expanding the horizon of fitness, virtual boxing matches vs other people or even an A.I figure, or even virtual basketball or football matches, the opportunities are endless. (Meta, 2021)

Work:

Working remotely during the pandemic had some mixed receptions, but a study from Business Insider from 2022 shows that the majority of office workers prefers to work from home. META thinks that remote work is here to stay for a lot of people, therefore investing into developing better tools to work together, by allowing for a VR-workplace. (Meta, 2021)

Education:

Using the Metaverse VR technology one would be able to teleport to basically anywhere they want. Even historic times, allowing people to learn more from hands-on experience. META believes this will be very important in the future, and set aside $150 million to train the next generation of creators to build immersive learning content. (Meta, 2021)

Commerce:

The goal is to create the opportunity of choice for the user. Being able to purchase clothes for the Avatar and being able to wear it all over the Metaverse. (Meta, 2021) Also allowing to merge online and offline commerce, allowing for purchasing real world items but being able to see them in VR or using AR technology to portray how it would look (Heethuis, N. 2022). The opportunities are nearly endless for commerce in a universe that merges real life with virtual reality.

Even with how big this project is for the Virtual Technology world, and if it succeeds could massively impact the markets. In a study by Statista in November 2021, they found that 25% of adults in the US have heard "not much" of the Metaverse project, with 38% people claiming they have heard "nothing at all" about the Metaverse project.

Goals & Study Aims

In the literature review, we have now looked at some of the sales from the VR and AR industry, and in my opinion we have enough basis to state that the VR/AR industry has not yet lived up to its expectation, over 6 years after the first releases of the high-end VR-devices. With weak sales numbers, fortunately with high growth year-by-year, the VR-industry has not yet become fully competitive, especially within the gaming industry where it has been expected that VR will have a massive impact.

The questions that naturally arise are: Why are VR sales still so relatively low? Given its ability to disrupt technology and its seemingly limitless possibilities, why is VR not more popular?

There seems to be a gap where on one side the fact that VR is spoken highly of, and the seemingly limitless possibilities that VR entails, and the other side where the sales numbers are still relatively low, why is this the case? Which factors are stopping VR/AR technology from being a standard household device within the Norwegian market?

The aim for this study is to investigate which factors are contributing to why the VR/AR industry is still performing as well as forecasted and perhaps expected. Using the results from an in-depth interview, as well as a survey. The aim is to shed some light on what

specifically is missing for the VR/AR industry. With these results, we can hopefully not only identify what is missing, but also uncover some solutions that could potentially help unlock VR/AR industry's full potential. Therefore, the main research question is as follows:

Why is the VR/AR industry not performing as well as forecasted within the Norwegian market?

Methodology

Design & Hypotheses

In this thesis we utilized both quantitative and qualitative data in the forms of an online questionnaire, as well as an in-depth interview. After having collected enough secondary data, and establishing a good understanding of the industry, we were able to develop several hypotheses based on the secondary data collected. Using the data collected from the qualitative and quantitative to answer these hypotheses, provided us some significant results towards the aim for this study. The purpose of both the qualitative and the quantitative research is to figure out what the population's attitude towards VR/AR technology is.

Hypotheses

We have developed 7 different hypotheses that we wish to prove true or false in order to answer the research question: Why is the VR/AR industry not performing as well as forecasted within the Norwegian market?

To develop the hypotheses I have used a combination of secondary research as well as common sense to formulate these statements. Using the results and the insights gathered from

the qualitative and quantitative comparison we will hopefully be able to answer the following

hypotheses:

H1 - The majority of the consumers have heard, and are familiar with VR-technology.

H2 - The majority of the consumers have heard and are familiar with AR-technology.

H3 - VR/AR is not performing as well as forecasted within the Norwegian market.

H4 - The VR industry has a high growth potential.

H5 - There are still areas and industries where VR would have high potential.

H6 - The price of VR-devices is in a good spot.

H7 - As VR grows, so will AR.

Using both qualitative and quantitative data provides better results than using only

one method of data collection. Qualitative data collection generally requires more resources

and time, but also provides a deeper understanding as the research subjects will be able to

explain their thought process in detail, as well as the interviewer being able to measure

responses based on body language. However, in an in-depth interview there is room for error,

and leaving us with no answers to questions we need to solve. By generating an online

questionnaire, we are able to gather more data, making the study statistically representative,

as well as reduce the chances of the interview subject being outliers, although the chances of this is relatively small.

The in-depth interview will be conducted via Zoom/Teams, or in person, depending on the wish of the subjects. This is due to the restrictions considering the Covid-19 situation at the moment, the subject had the right to choose how they will be interviewed. An in-depth interview guide was created, giving the interviewer an overview of which questions and topics that need to be talked about. Subjects were able to speak freely, as long as the research topic stayed related to the questions that were being asked. Questions could be skipped if the interviewer feels like this topic has already been sufficiently covered previously in the interview. The objective is to make the interview feel like a natural conversation with the subjects, in order to establish trust, and receive genuine and reflected takes on the topic.

The questionnaire will be completely anonymous, and not too long in order to get as many respondents as possible. The data collected will be analyzed using SPSS software, and the survey was generated using the software from SurveyPlanet, available online.
The questionnaire consisted of 13 questions, in which the respondents were first asked some basic questions such as age and occupation. The respondents were then asked for their knowledge and experience with VR and AR. Lastly the respondents were asked what they think about the future of VR, and in which areas they see VR as having the most potential.

If the findings from the online questionnaire and the in-depth interview were completely different, more in-depth interviews would have been conducted, as there is a possibility that one or more of the subjects could potentially be statistical outliers.

The interview was conducted via Zoom/Teams, considering these data do count as "personal data", a request was sent and approved by the NSD. Before every interview, each participant was sent a consent form with the purpose and information regarding the assignment, which they had to agree to verbally in the interview.

Sample

The population of the research is the mass market in the Norwegian market. Which includes basically everyone resident in Norway. Limiting the population is incredibly hard, as in general VR/AR technology is open to everyone, therefore, even though identifying segments based on psychographic or geographic factors is possible, it makes little sense to do it in this study. However, given that we found a link between age and early adopters,with young people being more open to new products. We also have identified a link between age and the experience with VR, with people in the age group of 29 and below having the most experience with trying VR, and a steady decline in people having any experience with using VR in the older age groups. There is no need to differentiate between the population of the qualitative and quantitative data, as the objects of study in the in-depth interview as well as a majority of the respondents of the online questionnaire are both part of the population.

Data Collection

Quantitative Study - Online questionnaire:

According to Fan & Yan (2010), web surveys have several advantages, a short transmitting time, low delivery cost, several options for design as well as less time required for data entry, all of these factors were relevant for choosing an online questionnaire as a method for collecting data. The online questionnaire was generated using the SurveyPlanet tool that is available online. As SurveyPlanet would qualify as a third-party actor in terms of privacy, no

questions revealing the respondents privacy or personal data was asked for, and therefore required no permission from NSD (Norwegian Social Science Data Service), as had been discussed and responded to by a representative of the NSD.

The questionnaire was published on my personal Facebook page as well as on LinkedIn, where a majority of the network would be based in Norway, and therefore part of the Norwegian market. This was done deliberately as having a lot of non-Norwegian respondents would skewer the results from the online questionnaire, as it is based on the Norwegian market.

Qualitative study - In-depth interview:

The in-depth interview will be conducted with employees/students in an area where VR/AR could be relevant, and especially within IT/Computer Sciences. The subject of this study are friends or acquaintances, which I know will have some insights regarding VR/AR. The in-depth interview will include first name and recordings of the objects of study, and the NSD has been notified and approved of the process in discussion. An interview guide has been created, in order to keep track of the topics that need to be discussed. The results of the findings will be the main source of data collected in this study, and the quantitative data will be used to verify/refute the insights provided from the objects of study in the in-depth interview.

Measurements

Quantitative Study - Online questionnaire:

For the quantitative study, we are going to analyze the responses received in the online questionnaire. The data collected from SurveyPlanet will be exported and entered into the SPSS software tool. SPSS is a statistical tool used to analyze important data that can give us some insights based on the credibility and the quality of the study.

Qualitative study - In-depth interview:

For the qualitative part of the study, an in-depth interview will be used. A combination of the results gathered from the online questionnaire and the responses offered by the objects of study will be used to generate insights into answering the hypotheses we developed, and therefore answering the main research question.

Specifically, the in-depth interview will be conducted either via Zoom/Teams, or in person depending on the subjects preference. In-depth interview is a low-resource collection method, but at the same time is one of the best data collection methods that can be conducted as it offers deeper insights than a quantitative study by itself. The subjects will be able to answer the questions asked by the interviewer in a relaxed setting of their choosing. It is important that they have the ability to speak freely, and the interviewer will only limit the subject's ability to speak if they go off-topic. An in-depth interview guide consisting of 20 questions will be used in the in-depth interview, questions can be skipped if the interviewer feels that one or more of the responses of the subject has already answered the question previously.

The best responses and insights are provided when the subject is able to think, and speak freely without much interruption from the interviewer. The in-depth interview guide also consists of open questions which are important as not to impact the subjects opinions, and allowing them to speak freely without judgment. The interview will be conducted in either English or Norwegian, whatever the subjects feel more comfortable with. This is done to limit errors based on translation, which can happen if the subject translates their own opinions wrong, or if the translation error happens when writing the transcripts. Significant translation errors are not likely to happen, however it is important to emphasize that it could occur. To limit the chances of this happening, subjects will be able to answer in either English or Norwegian.

Data Analysis

Quantitative Study - Online questionnaire:

Using the SPSS software we are able to measure and analyze the results from the survey. This will allow us to draw inferences as well as generalizations of the whole target audience. As responses as statistical information alone is not beneficial to a company in itself, the analysis, trends, patterns and the insights offered by interpreting the data does. The most important statistical survey analysis methods are the ANOVA test, and the statistical T-Test. However, we will only be using the ANOVA-test for this study. All of these will be conducted using the SPSS software. In addition to this, reliability as well as validity will be measured. Reliability reflects whether or not the results of the study can be reproduced and repeated given the same conditions. Validity reflects to which extent the results of a research measures what it was originally meant to measure. The statistical data collected will also be used to test the Hypotheses developed earlier.

Qualitative study - In-depth interview:

After finishing the transcripts, the data collected from the in-depth interview will be analyzed and compared, to see if there are any corresponding answers with the other in-depth interview, to check for similarities or dissimilar answers. When this has been done, the similarities and dissimilarities will be compared to the results of the quantitative results. If these answers are corresponding to each other we can call them an insight, as the sample as well as our in-depth interview subjects share the same opinions. Hopefully, we have also received some form of reasoning behind the answers from the interview, and therefore being able to provide answers to the hypotheses that are based on statistical results.

Data Collection and Sample

Quantitative Study - Online questionnaire:

After publishing the questionnaire, it was left open for responses for approximately two weeks, in which the questionnaire had a sample size of 45 respondents. The 45 respondents are not what is considered to be statistically representative to the population, so it can unfortunately not be used to generate a mirror of what the population thinks. With the massive population size for this study, finding enough respondents to make the study statistically representative is nearly impossible, or would require too many resources. So we have to account for statistical errors or statistical bias, and it is the reason we are not solely gathering information based on the online questionnaire, but utilizing in-depth interviews as well to verify/refute the data found in the online questionnaire. Data was exported from SurveyPlanet and the data was imported to the SPSS software. However, the results from the questionnaire do offer some insights into the situation of VR/AR in the Norwegian market, and it can be used to verify/refute some of the insights collected in the in-depth interview.

Qualitative study - In-depth interview:

The qualitative study consists of one in-depth interview with Emma, a 22-year old information science student living in Bergen. Using the data collected from the interview we are able to verify/reject some of the insights created in the quantitative analysis. By comparing this data we are able to get some good insights. The sample size of one single interview is relatively weak. However, the in-depth interview is not meant as a solid source of information gathering on its own, but to work in tandem with the quantitative analysis. The data collected will be evaluated and some of the key takeaways will be presented in the results section.

Results

Quantitative Study - Online questionnaire:

Respondent Profile

In order to get the best possible results from the questionnaire, a respondent profile is necessary. The respondents are the group of individuals who have completed a survey or an interview, in this case we are just going to analyze the respondent profile for the quantitative study. In social science, a respondent profile plays a very significant role. The personnel characteristics of responses on either voluntary or involuntary participation forms the backbone of the scientific explanation (Glaser, 2012). The respondent profile often contains demographic variables such as gender, age, education, ethnicity and employment status. However, not all of these variables are completely necessary for all given studies, and there are some of these demographics that were deemed irrelevant for this study such as gender and ethnicity. The education level and the employment status were combined into one question in this questionnaire. Overall, the purpose of a respondent profile is to get a general overview of

demographic data of the respondents. In order to get as many respondents as possible to complete the full survey, normal survey questions such as gender and race were deemed irrelevant for the study. Education/Employment status were also combined to reduce the amount of questions of the survey.

After importing the data to the SPSS software, the first thing done was to eliminate statistical outliers. This is done to eliminate the margins of error, as well as eliminate potential misclicks, which could contribute to skewed or slightly misleading results. Fortunately there were no major outliers identified, and all 45 respondents finished the entire survey.

Our respondent profile looks like this: 73,3% of the respondents were between the age of 25-34 years old, with 20% being between the age of 16-24 years old, and 4,4% being between the ages 35-44, and lastly one respondent was between 45-54 years old. This testifies to a relatively young respondent profile, in which there is a higher probability that they have heard about VR/AR previously, compared to if there was a group of respondents that were older.

Choice	Total
0 - 15 years old	0
16 - 24 years old	9
25 - 34 years old	33
35 - 44 years old	2
45 - 54 years old	1
55 - 64 years old	0
65 - 74 years old	0
75 years old and above	0
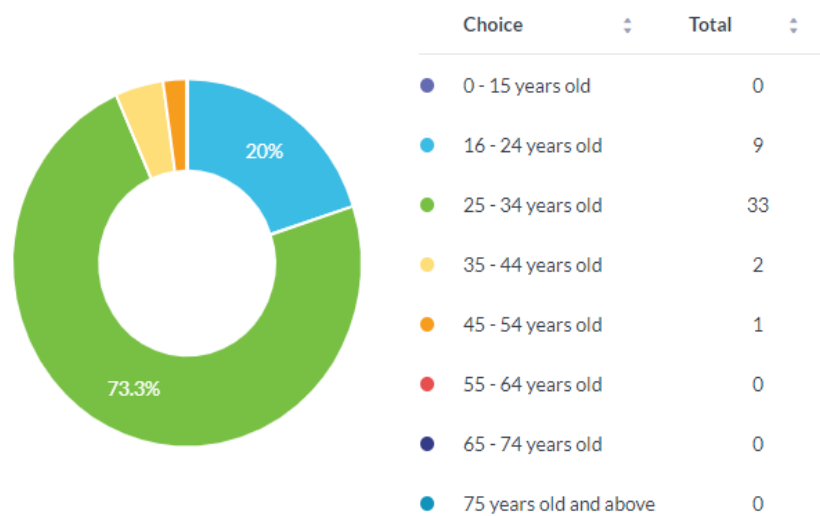
As for occupation, 40% of the respondents were students with a form of part

Unemployed	1
Student without part-time Job	4
Student with part-time Job	18
Architecture	0
Arts, Design, Entertainment, Sports, and Media	1
Building and Grounds Cleaning and Maintenance	0
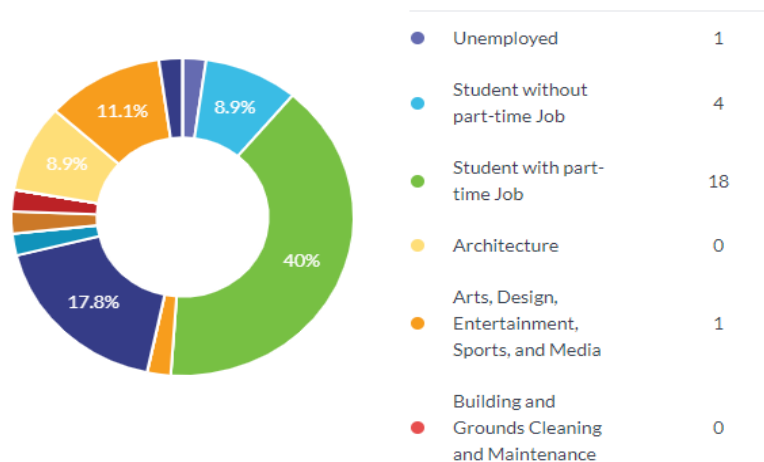
time job, with 17,8% of the respondents currently working in the business and financial

operations industry.

Other less significant occupations were office and administrative support, sales, engineering,

education, social service, and students without part-time jobs.

With a relatively young respondent group, having a relatively high number of students is not

very surprising when adding in the fact that 42 of the 45 respondents were between the ages

of 16-34 years old.

Considering the mediums at which the survey was published (Facebook, LinkedIN) it

is not a big surprise that many of the respondents are relatively young, as many of my friends

and followers on these media platforms are relatively young. Having a young respondent

profile is not a bad thing, however if there was a balanced response level from individuals of

all age groups, it would have provided for better results in terms of the situation VR/AR

technology is in at the moment, with a young respondent profile the results will more or less

be based on the perception of the younger generation, with little to no input in how the older

generations perceive these relatively new technologies. We already identified a link between

age and being early adopters, as well as the link between age and willingness to try new

things. Therefore we can assume that these respondents are not a sample of what the full

population thinks, but probably more of a sample that illustrates the attitude and views of the

young generation.

Reliability Analysis

According to IBM, Measuring reliability allows us to study the properties of

measured scales and the items that compose the scales. It also calculates a given number of

commonly used measures of scale reliability and provides information about the relationship

between the individual items of the scale.

There are several threats to the research reliability, these could be "participant error".

which includes any factor that alters with the way in which a participant/respondent performs.

There is also "participant bias", which includes any factors that would provide a false

response. On the researcher side there is also room for errors to occur. There is the term

"researcher error", which includes any factors that alters with the researchers interpretation of

the results. Last but not least, there is the term "researcher bias" which includes any factors

that induce bias in the researchers interpretation of the responses.

The reliability analysis offers the ability to determine to which extent the items in the

questionnaire are related to each other, and an overall index of the repeatability or the internal

consistency of the scale. Using this information,

it is possible to identify which items of the

questionnaire that should be excluded or included

in the study. Cronbach's Alpha is the most

popular method of conducting a reliability

Case Processing Summary

		N	%
Cases	Valid	45	100,0
	Excluded[a]	0	,0
	Total	45	100,0

a. Listwise deletion based on all variables in the procedure.

analysis. Cronbach's Alpha tests to see if the multiple Likert Scale questions are reliable,

however, our survey is not designed with Likert Scale questions, so we will instead use the

split-half analysis on the scale question in our study, which is only question 10, regarding the

price of the VR devices. This method splits the scale into two parts, and then examines the

correlation between the parts. As this question is basically just one scale, not all of the

variables from the data analysis are relevant, as they would be misleading or wrong.

However, some of the results are relevant to the analysis. As we can see we had 45 valid

cases out of 45 total, which means the total 45 of responses were calculated in the process. As

the split-half method works best with surveys with a high number of questions, similar to the

other methods of analyzing the reliability of the survey, there is no optimal way of analyzing

the results based on the fact that the survey does not utilize Likert-scale based questions, therefore the reliability is not fully relevant to this study, and the reliability analysis was deemed unnecessary.

Validity Analysis

The validity refers to how accurate a method measures just what it is intended to measure. If the research has a high validity, it means that the results correspond to real properties, variations and the characteristics in the physical or social world. Furthermore, validity can be divided into four different kinds of validity; content validity, criterion-related validity, construct validity, and face validity. Content validity refers to which degree an assessment instrument is relevant and representative of the targeted construct it is intended to measure. The criterion-related validity measures how well one measure predicts the outcome of another measure. The construct validity concerns to which extent the research measures what it claims to measure. Lastly, face validity measures whether a test appears to measure what it is supposed to measure. As we can see, all of these methods of measuring validity are relatively similar and intertwined.

As the survey was not created with a Likert-scale design, converting the results into numerics would have been the optimal way in analyzing the statistics, and measuring the validity. Most of our questions are regarded as string variables, and these cannot be analyzed the same way utilizing the factor analysis. However, question 8 and question 10 are able to be measured.

The Kaiser-Meyer-Olkin measure or KMO, as it is also called, is measured to be .482, which is relatively low. This score measures how suited the

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,482
Bartlett's Test of Sphericity	Approx. Chi-Square	52,331
	df	21
	Sig.	,000

data is to factor analysis. Having a score of .482 could be interpreted as the data that is

collected is not very well suited for factor analysis. This is to be expected, as only two of our

questions are able to be analyzed using factor analysis.

As we can see on the right, the communality score is

relatively high. The communality score is very useful for

predicting a variable's value. It helps us tell which

proportion of the variance is a result of either: The principal

components or the correlations between each variable and

individual factors (Vogt, 1999). The score ranges from 0 to 1

and a score of 1 indicates that there does not exist any

unique variance at all, and a score of zero has a variable

with variance that is completely unexplained by other

variables. We can see that we have a relatively high

extraction value on most of the questions, except for the

question regarding price on Q10, where there is a score of

.440.

Communalities

	Initial	Extraction
Q8 - What would you consider a reasonable price range for a VR-device? (Approximately) (Low)	1,000	,764
Q8 - What would you consider a reasonable price range for a VR-device? (Approximately) (High)	1,000	,697
Q10 - Please rate the following statements regarding VR: (VR is performing according to what i expected the first time i heard about VR.)	1,000	,682
Q10 - Please rate the following statements regarding VR: (The VR industry has a high-growth potential.)	1,000	,797
Q10 - Please rate the following statements regarding VR: (There are still areas and inustries where VR would have a high potential.)	1,000	,707
Q10 - Please rate the following statements regarding VR: (The price of VR-devices is in a good spot.)	1,000	,440
Q10 - Please rate the following statements regarding VR: (As VR grows, so will AR-technology.)	1,000	,717

Extraction Method: Principal Component Analysis.

ANOVA-test

The ANOVA test is used to test variance. It is used to find out if a survey or

experiment results are significant, that means it would help us figure out if we need to reject

or accept our hypotheses. By testing different groups of respondents to see if there is any

difference between them. However the ANOVA test has a slight drawback, a one-way

ANOVA test will tell us that there are at least two groups that are different from each other,

but it will not be able to tell which groups it is. However, this can be solved by running an ad

hoc test such as Least Significant Difference test to identify the groups.

We found that in Q8, there were big differences in acceptable prices. However, we can see that Low has a total mean (M) of 218,47, with a Standard deviation (SD) of 149,549, and a N of 45 as that is the number of respondents. For the High there is a total mean (M) of 595,84, a standard deviation (SD) of 388,132 and an N of 45. The standard variation is very high, but this is due to a relatively low sample size combined with a big discrepancies in the responses in the survey.

Oneway

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Q8 - What would you consider a reasonable price range for a VR-device? (Approximately) (Low)	1	3	190,00	69,282	40,000	17,89	362,11	150	270
	2	12	239,17	97,482	28,141	177,23	301,10	150	404
	3	18	201,67	109,937	25,912	147,00	256,34	150	500
	4	9	251,22	281,165	93,722	35,10	467,35	150	999
	5	3	166,67	28,868	16,667	94,96	238,38	150	200
	Total	45	218,47	149,549	22,293	173,54	263,40	150	999
Q8 - What would you consider a reasonable price range for a VR-device? (Approximately) (High)	1	3	552,00	280,364	161,868	-144,46	1248,46	250	804
	2	12	579,08	250,324	72,262	420,04	738,13	203	1057
	3	18	555,89	414,228	97,634	349,90	761,88	200	1500
	4	9	777,78	549,422	183,141	355,45	1200,10	286	1500
	5	3	400,67	4,041	2,333	390,63	410,71	397	405
	Total	45	595,84	388,132	57,859	479,24	712,45	200	1500

The next thing we will do is to test the homogeneity variance by checking the significance value (SIG). If the number is greater than .05, one can say that we have not violated the assumption of homogeneity of variance. As we can see below, none of the scores are below .05 and therefore we can assume that our variance is homogenous.

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Q8 - What would you consider a reasonable price range for a VR-device? (Approximately) (Low)	Based on Mean	1,467	4	40	,230
	Based on Median	,351	4	40	,842
	Based on Median and with adjusted df	,351	4	14,257	,839
	Based on trimmed mean	,729	4	40	,577
Q8 - What would you consider a reasonable price range for a VR-device? (Approximately) (High)	Based on Mean	4,016	4	40	,008
	Based on Median	1,126	4	40	,358
	Based on Median and with adjusted df	1,126	4	27,885	,364
	Based on trimmed mean	3,410	4	40	,017

As we assumed that we had homogeneity in our variance we now look to the ANOVA-table, if there was deemed not to be homogeneity in our variance we would have to look at the robust test of equality of means.

The ANOVA table shows two significance values of ,864 for the low value, and a significance value of ,578 for the high value. A significance value less or equal to ,05 means that there is a significant difference for one or out variables. Fortunately we do not have a low significance value so the variance is homogenous.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Q8 - What would you consider a reasonable price range for a VR-device? (Approximately) (Low)	Between Groups	30359,311	4	7589,828	,318	,864
	Within Groups	953693,889	40	23842,347		
	Total	984053,200	44			
Q8 - What would you consider a reasonable price range for a VR-device? (Approximately) (High)	Between Groups	450054,994	4	112513,749	,728	,578
	Within Groups	6178374,917	40	154459,373		
	Total	6628429,911	44			

Other Results

As VR/AR technology is a relatively new and complex topic. It was necessary for the survey to include questions related to the subjects familiarity about the topics, and then going deeper and gaining more insights on their user experiences and what the subjects think about the present and the future of VR and AR technology. The design and the length that was chosen for the study made some of the data analysis very challenging. However, the questions asked were very straightforward, and therefore we are able to pull out some important insights that were generated in the questionnaire. The data collected in this part of the study will be compared to the results from the in-depth interview. From those results, we

are able to gain some insights into the situation of VR/AR technology, and provide a result that answers our research question.

Respondent experience with VR

One of the first questions that was asked was related to the respondents familiarity and the experience they had with VR technology. In terms of VR-technology, 97,8% of the respondents were familiar with the term VR. The respondents were then asked if they had ever used a VR device, 60% of the respondents had used a VR device previously, 37,8% had not, and 2,2% of the respondents were not sure if they had used a VR device previously.

As the respondent profile is relatively young, having 97,8% of the respondents being familiar with the term VR indicates that VR is something that most people have heard of, at least within the age group sample that our respondent profile represents. This is a good thing, as raising customer awareness of a product or a technology is very difficult in terms of marketing.

It is also very positive that 60% of the respondents had previously tried a VR-device, as this strengthens their contribution to the study, as they can speak from experience and not just imagination. However, the input from the remaining 40% is not useless, as this group is considered "potential customers", having the insights of these potential customers included in the study could shed some light into which factors VR-technology needs to focus on to be desirable to as many customers as possible. Having a mixture of 60/40 respondents that have used and not used VR devices is pretty good, and provides good insights from respondents with experience with the product, as well as respondents that have yet to use it.

Respondent experience with AR

AR technology, compared to VR-technology is relatively less popular, compared to VR. The respondents were asked about their familiarity with the term AR, and if they had ever used an AR-device. 37,8% of the respondents were familiar with the term AR, and 62,2% of the respondents were not. 17,8% of the respondents had previously used an AR-device, 60% had not, and 22,2% of the users were not sure if they had ever used an AR device.

AR is evidently not as popular as VR, as only 37,8% of the users were familiar with the term, and as little as 17,8% of the users had tried an AR-device previously. It is notable that 22,2% of the respondents were not sure if they had ever used an AR-device, this combined with the general relatively unawareness of the term AR, could indicate that many of the respondents do not know what an AR-device is in the first place.

Compared to VR, where almost all of the respondents had heard of the term VR, as little as 37,8% were familiar with AR, and 62,2% of the respondents had not heard of it, it is reasonable to say that our respondent profile has more experience and knowledge about VR, rather than AR, and that the insights regarding VR will be more solid and backed by opinions based on experience, rather than just guessing.

Pricing

One of the most important aspects when it comes to trying new things, is the pricing. In the survey, respondents were asked if they had ever considered buying a VR or an AR device. 37,8% of the respondents answered that they had considered it, 57,8% had not considered it, and 4,4% of the respondents were not sure if they had considered it previously.

The respondents were also asked what they considered to be a reasonable price range for a VR-device, in which the average low-end of the VR-devices were at about €218,47, and the higher range VR-devices being €595,84. The scale was capped at a minimum of €150 and capped at a maximum of €1500, as most of the most popular devices are in between this price range.

In addition to this, the respondents were also asked to rate the following statement on a scale of 1-5, in which a score of 1 would equal "strongly disagree", and a score of 5 would equal "strongly agree". The statement was; "The price of VR is in a good spot". The average response was 2,84. The general consensus seemed to be a score of either 2 or 3, with 11 respondents answering 2, and 29 respondents answering 3. This indicates that the price is generally OK, but a less significant number of the respondents slightly disagrees that the price is in a good spot.

Usage areas for VR

There are multiple usage areas for VR. In our survey the respondents were asked about seven different areas in which VR can be used. The respondents were asked to respond to what purpose they would use VR, if they were to buy one. It is worth to note that the respondents had the option to click on several options that they would imagine using it for, not just selecting one of the seven.

Not surprisingly, 40 out of the 45 respondents answered that they would be using it for gaming. Gaming is of course one of the main areas that VR is used for today as

Choice	Total
Gaming	40
Work	9
Education	8
Social	18
Movies/Tv-series	26
Tourism	7
Other	4

we covered earlier in the study. Other than that, the two other significant areas of usage were movies/tv-series, with a total of 26/45 respondents, and social use, with 18/45 respondents. The respondents would use it for other purposes as well, such as work, education, tourism and other areas, however less than 10 respondents figured they would use Vr technology for one of these purposes. As expected, entertainment areas such as gaming and movies/tv-series were the big winners in terms of areas of use.

Other respondent insights

The respondents were asked to rate the following statements on a 5 point LIKERT-scale, in which 1 equals strongly disagree, and 5 equals strongly agree. That would mean that a score with a 1.0 average score would have all of the respondents strongly disagreeing with the statement, and a score of 5.0 would mean that the respondent would strongly agree with the statement.

- VR is performing according to what i expected the first time i heard about VR.

With a total average score of 2.93, there seems to be a slightly less than satisfying performance of the VR industry today, compared to the first time the respondents heard about VR technology. However, this question does not take into consideration if the respondent had high expectations for VR in the first place, as this can vary massively for each respondent. However, a score of 5.0 or a score of 4 and above would qualify as to the respondents agreeing that VR is performing as expected. However, as the score is relatively low with a 2.93, it is reasonable to conclude that VR is not performing up to what the respondents expected the first time they heard about VR.

- The VR industry has a high-growth potential.

With a total average score of 4.18, there seems to be a relative agreement towards VR having a high growth potential. However, it is not specified in which areas VR industry has the growth potential, just the general idea that VR industry still has potential growth.

- There are still areas and industries where VR would have a high potential.

With a total average score of 4.22, similar to the previous statement, there tends to be a relative agreement that there are still areas in which VR would have a big growth potential.

- As VR grows, so will AR-technology.

With a total average score of 3.62, there is slight agreement that AR and VR will grow in tandem, with a growth in the VR-industry, it will impact the AR industry as well.

The respondents were also asked about what they considered to be the challenges that VR faces, especially within the Norwegian market. The respondents were able to pick several of the options presented.

There are two standout factors that the respondents deem to be the biggest challenge that VR-industry faces. These being the price of purchasing a VR-device, and the limited ability of trying a VR-device before purchasing. 30/45 respondents answered that they think the price of purchasing the devices are the biggest challenges that VR technology faces, with 28/45 respondents claiming that they think the limited ability to try the devices before purchase. As a purchase of a VR device would be considered a big purchase for most people,

combining this with little opportunities to actually try the device before purchasing provides a combination that leaves VR-technology with a relatively high entry cost.

The respondents were also asked, if given the opportunity, which area would they emphasize the most out of a couple given options. The respondents had the opportunity to pick several options. Some of the most notable ones were marketing, gaming, entertainment (exclusive tv-series/movies), improving software related to education, increasing social value, as well as expanding to new industries.

28/45 of the respondents claimed that they would emphasize the most on the marketing aspect of VR, which of course is a very wide term, as marketing could mean a lot of things. The respondents were not asked to specify which aspect of the marketing they would improve, but marketing in general is something that was recognized as something that needed to be focused on.

Furthermore, 24/45 respondents also wanted to focus more on gaming, as well as entertainment. Gaming and entertainment, such as movies and tv-series is something that over half the respondents of the survey would spend resources to develop. It was also highlighted that exclusive movies or tv-series could be an option to improve popularity.

To add on to that, improving the software related to education was something that 18/45 respondents would focus on, as it is predicted that VR-technology will have a big future within education.

Lastly, focusing on increasing the social value of using vr, as well as expanding into new industries were something that 17/45 respondents wished to emphasize on.

A less significant number of the respondents also answered that they wanted to focus on publishing tutorials, increasing opportunities for tourism, as well as the "other" option.

The last question that the respondents were asked was if they considered buying a VR-device in the future. In which 11/45 said yes, 10/45 said no, 21/45 were undecided, and 3/45 already owned a device.

Going a little bit deeper into the results, taking a closer look into the three respondents that already owned a device, The respondent profile are as follows:

Respondent 1 (R1	Respondent 2 (R2)	Respondent 3 (R3)
25-34 years old	25-34 years old	35-44 years old
Business and Financial Operations	Student with part time job	Business and Financial Operations

Interestingly, when it comes to Question 8, regarding the reasonable price range, there are big discrepancies between the respondents. R1 claims that a reasonable price range in Euro would be between 150-305, R2 claims ranges between 404-927, and R3 ranges between 150-512. This could of course be linked to the purchasing power of the respondents, but it is interesting to see that a student with a part time job has a higher limit significantly higher than R1 and R3. It is also worthy to note that these three individuals are also relatively young.

There are some discrepancies in between the usage areas of the respondents, but that is to be expected due to people simply being different and having different interests. R1 and R2 both are using VR for gaming, but R3 is not. However, R3 is using VR for work, whilst R1 and R2 are not.

Interestingly, R1, R2 and R3 are all using their VR-devices for watching movies and TV-series. Although this sample size is very small, it is a positive indicator that there are many people using their VR-devices for movies and TV-series, or entertainment in general.

Summary - Quantitative Study - Online Questionnaire.

The respondent profile for the quantitative study is relatively young, with 73,3% of the respondents being between the age of 25-34 years old, and 20% being between the age of 16-24 years old. This provides us with a relatively young respondent profile that will most likely provide different results, if compared to an older respondent profile. Due to the age of the respondent profile, there is a higher likelihood that the respondents have heard, or used VR/AR devices previously.

Furthermore, 40% of the respondents were students with a form of part time job, with 17,8% of the respondents working in the business and finance industry. The rest of the respondents were split pretty evenly around working in office and administration, sales, engineering, education, social service and students without part time jobs. It is worthy to note that age also affects purchasing power, and that a student living on less than minimum wage would have a smaller opportunity to purchase a VR/AR device, compared to a full-time worker.

Due to the mediums to which the survey was published, there is no surprise that the respondent profile is relatively young, and the likelihood of the respondent being based in Norway being very high. This is a good thing, as the survey is based on the situation of VR/AR in the Norwegian market specifically, and there is a high probability that the respondents are answering based on their experience in the Norwegian market.

We had previously identified a link between age and early adopters, so it is important to note that the survey will not share the opinions of the full population, but be more skewed towards the perspectives of the respondent profile's age groups, which consists mostly of individuals under the age of 34.

97,8% of the 45 respondents were familiar with the term VR, and 60% of the respondents had used VR previously. This is a good indicator that many of the responses will be based on actual experience with the devices, and not just speculation. However, the other 37,8% that had not used VR previously has a highly valued opinion as well, as this group can testify to which factors would need to be improved in order for them to consider purchasing or trying a VR-device. As 97,8% of the respondents were familiar with the product or the technology, this is a very good thing, as raising customer awareness or "teaching" the consumer about a product is one of the hardest things to do within marketing.

With 60% of the respondents having experience with VR and 40% having not, there is a good split between responding based on experience and responding based on speculation and imagination. This offers great insights from both users with experience with the product, as well as respondents with little experience with the product.

In terms of the respondent experience with AR, the story is somewhat different. Only 37,8% of the respondents were familiar with the term AR, and upon being asked if they had ever used an Ar device, 60% had not, and 22,2% were not sure if they had ever used an AR

device. Combining these numbers, with the relatively unfamiliarity with the respondents experience with AR, it could be a strong indicator that many of the respondents does not know what AR is, and that many of the respondent that answered that they had never used an Ar device before, simply does not know what an AR device is. As an AR device could be as simple as a cellphone, there is a very little likelihood that 60% had not used one, and that 22,2% of the respondents were not sure they ever used one. The general unawareness of the AR products and AR technology provides us with responses that are less based on experience, but more on guessing and speculation, compared to VR.

When it comes to pricing, the average accepted price of the respondent was a price between €218,47 on the low end and €595,84 for the high-end devices. There were also split responses on whether or not the price of VR is in a good spot, but the general consensus is that the price was not in an OK spot.

The respondents mainly would use the VR-device for gaming and movies/TV-series, but it was also used for work, education, social activities, tourism and some other activities. However 40/45 of the respondents answered gaming so that is by far the most common answer for the respondents.

The general consensus of the respondents seems like VR is performing less than satisfying compared to the first time they heard about VR, with a score of 2,93/5.00 when asked If they agreed to the statement that "VR is performing to what I expected the first time I heard about VR".

With a score of 4.18/5.00 there seems to be a consensus that the VR industry has a high growth potential, and a 4.22/5.00 score on the statements that there are still industries that VR would have a high potential. Lastly, with a 3,62/5,00 score, there also seems to be a general consensus that if VR grows, so will AR technology,

The biggest challenges that VR faces in the Norwegian market were deemed to be the price of purchasing a device, combined with the limited ability to try a VR-device before purchasing. 30/45 respondents claim that the price is the biggest challenge, and 28/45 respondents claim that the limited ability to try is the biggest challenge. It is safe to say that a combination of these two challenges this allows for having very-high price barrier, and it is generally hard for the consumer to evaluate pro's and con-s without trying different devices, and this affects the alternative evaluation stage of the purchasing cycle (Kotler & Armstrong, 2018)

28/45 respondents claimed that they would focus most on the marketing aspect, 24/45 respondents would also focus more on gaming and entertainment. To add on to this, improving software related to education was something that 18/45 respondents wanted to improve on the products.

Lastly the respondents were asked on whether or not they would consider buying a VR-device, in which 11 said yes, 10 said no, 21 were still undecided and 3 of them already owned a device. Having almost half of the respondents still undecided on buying the product is interesting, as this could indicate that it is not something that they have decided that they don't want just yet, just that they are waiting for some improvements to be made.

Qualitative study - In-depth interview

Our qualitative study consisted of a single in-depth interview with a student called Emma. Emma was presented with approximately 20 questions regarding the VR/AR industry. The questions asked in the in-depth interview were pretty similar to the questions from the quantitative analysis, so a comparison between the results should be possible in most cases. We can divide the responses from the in-depth interview similarly as we did with the qualitative analysis, dividing the results into sections; the respondent profile, respondent

experience with VR, as well as with AR. Pricing, usage areas for VR/AR, the future of

VR/AR and challenges are all important sections that Emma has talked about. We will also

include some other insights that came up during the interview.

Respondent profile

The respondent profile is not too hard to identify, as there was only one subject that

was interviewed in the qualitative data collection. Emma is a 22-year old information science

student that has had previous experience with the usage of VR-technology, so she was able to

offer some insights based on the experience of using the devices as well. Similarly to the

respondent profile in the quantitative analysis, the respondent profile in the qualitative

analysis is also relatively young. As we had already uncovered, there is a link between age

and being early adopters, as well as the link between age and willingness to try new things.

Having a young respondent profile in both the qualitative and the qualitative data results, it is

more likely to be similar opinions, as opposed to one of the respondent profiles being

significantly older than the other one. As this is a positive thing, it is also worthy to note that

as the respondent profile is not likely to represent the full population, as an older respondent

profile would most likely have less experiences and encounters with VR/AR technology, and

therefore have different responses.

Respondent experience with VR

When asked about her familiarity with the term VR, the respondent said that she was

familiar with it, and had tried it once or twice. The respondent did not know anything else

about the technologies or the technical terms other than that behind it. She knew it was a

platform that could be used for gaming and that was about it.

The respondent was then asked about what she enjoyed the most and what pulled her towards using it. She responded that she didn't really enjoy it that much, as she did not enjoy being disoriented as she did not know exactly where she was in the room at all times. She also said that it was a family friend who had bought it, and she was able to try it from them.

The respondent was asked about if she used a full on helmet, or a simpler device such as goggles with controllers, and the respondent had just used a simpler device.

The respondent was then asked if she did enjoy any of the aspects, or if she disliked everything. To which she answered that she did two different things when trying VR: The first one was sitting in a roller coaster, and she did not enjoy that because it felt very real. And the other thing was playing a game where the job is to hit blocks in order to play a song. She said it was very hard. The respondent did not mention the game name specifically, but the description of the game makes it sound like she played Beat Saber, which is one of the most popular games for VR.

The respondent was asked about what it would take for her to use VR, and was asked if it is just the helmet itself that is the problem or the sensation of being disoriented. To this question the respondent said that for her to be using VR, it would have to be for a game that she found very interesting, or a game that she was familiar with that got adapted into VR, as for example Call of Duty. She also mentioned the ability to connect with friends and play with them online.

Respondent experience with AR

The respondent was asked about her experience with AR, but she had never even heard about the term. Therefore it was concluded that it was not necessary to keep asking the

questions related to AR, and simply focus on VR technology for this interview in order to keep the focus high, and not keep asking questions that the respondent would not have any basis to respond to.

Pricing

The respondent were presented with the current price of VR-goggles in Norway, which is located around the 4000NOK (approximately €390) mark on average, and then asked to reflect on what she thought about the price.

The respondent claimed that the price is considered to be expensive, but that there was an understanding of why it had to be expensive as it has a lot of technology going into it. She also claims that as it is a relatively new technology, a drawback that VR has is that consumers are not familiar with the product, as they would be when purchasing a device such as a Playstation or an Xbox. The respondent said that they would not personally buy a VR-device mainly due to its price as well as it being "unknown".

Usage areas for VR

The respondent was asked about the current situation of VR in the Norwegian market specifically. To this the respondent said that she had no personal friends that used VR-devices, except for the family friend that she had tried it with previously. Apparently, the same family friend sold his device after half a year of using it.

The respondent was also asked to compare the situation that she perceived VR to be in today, versus the first time she heard about VR and the expectations she had made then. To which the respondent said that it had been less successful than when she first heard about it, and that it was mainly due to people being scared of trying new things, as well as it being

very different. She also said that it made sense to her that VR had not caught up with the other competitors in the gaming industry, as gaming was the only usage area that she was familiar with.

The future of VR

When asked about the future of VR, the respondent said that she believed it would have a future if it adapts to different elements such as educational purposes, a simulator for studies or job opportunities. The respondent also said that it had different possible options, but that educational purposes was where she mainly saw it going.

The challenges VR faces

When asked about the biggest challenges that VR-faces in the Norwegian market, the respondent said that it was most likely to be the cost (price), as well as being relatively unknown to the consumer. She also mentioned that people do not have the ability to test the devices before they are used, and that the marketing of the devices just had a word-of-mouth type of marketing where one has to listen to other consumers to verify if a product is good or not.

After this response, the interviewer was informed about an announcement that META had made, that said they would be opening physical stores in order to allow consumers to try the device before purchasing, and the respondent was asked to express her opinion on this. The respondent said that it would be a good decision as it allows for more possibilities of the consumers liking it and wanting to try it for themselves. The respondent also said that it is important to note where these stores will be located, if it is only in the United States or all over the world.

Other results

The respondent was asked what she personally would do to increase the popularity of VR, if she was given the chance. The respondent said that she would make it possible for all of the consumers to try the devices before purchasing, make a design that is appealing and comfortable, as the device is physically on you.

The last question that the respondent was asked is if she had any other thoughts about VR or Ar in general that the interviewer had not covered, to which the respondent said that she had no further thoughts that needed to be expressed.

Summary - Qualitative study - In-depth interview

To summarize the results from the in-depth interview. It was a relatively short interview, about 15 minutes long with approximately 15 questions covered by the in-depth interview guide and its topics. The respondent was a young student with previous experience with VR-technology, but little to no knowledge about AR-technology, Therefore this interview focused almost exclusively on the VR-related questions in the in-depth interview guide.

She was asked about her experiences with VR, the areas of usage for VR, the future of VR, some challenges that VR faces, as well as if she offered some other insights that were not covered under the main headlines.

It is relatively clear from this interview that a new technology such as VR is struggling. With a high price barrier, meaning having a too-high price of the product, combined with little to no possibility to try the product makes the consumer nearly

100-percent reliable on word-of-mouth marketing from friends or other influencers to make

an informed decision on if to buy the product, and which product to purchase. The respondent

claimed to understand that she understood that the price had to be relatively high, as there

was a lot of advanced technologies and research going into the VR-technology industry.

The respondent also has the impression that gaming is the only usage area that is

relevant for VR today, and only mentions education as one of the possible industries that

would benefit from utilizing VR-technology in the future. As the only usage area was

considered to be gaming, the respondent understood that competing with massive companies

such as Playstation and Xbox would be tough.

The respondent did have the perception that VR was not performing as expected when

she first heard about it in 2015-2016. And still considers VR-technology to be a "new"

technology.

Lastly, the respondent was asked which measure she would take to increase the

popularity of VR, in which she responded that she would focus on making it available for the

consumers to try the devices pre-purchase, as well as improving the design and the comfort of

the devices itself.

Compared results - Qualitative and Quantitative

Now that we have summarized the most important takeaways from the qualitative and

the quantitative study, there has been identified some similarities and some differences

between the results. These results gained from both the in-depth interview, as well as the

online questionnaire have been compared and some of the key similarities and key

differences between the two will be presented. The similarities found are mutually backed by

each other, in order to establish a solid backing for the insights that we have identified in the similarities.

Let us start out with the few differences that were identified. In the quantitative study, 40% of the respondents were students with a part time job, as well as a significant percentage were full time workers. Meanwhile our respondent for the qualitative study was a student without a part time job. This could be a weak indicator towards the purchasing power of the quantitative study being higher than the purchasing power of the respondent from the qualitative study. However, as we did not ask for any salary or details related to income and spending, this is very conditional and could very well be false.

It was also identified that the respondent from the qualitative study only mentioned gaming/entertainment, as well as education and work (job opportunities) as other usage areas for VR. Whereas the quantitative study found that there were multiple areas of usage in which VR could be utilized, such as social use and tourism. Although work, education and gaming/entertainment are the most popular areas to use VR at the moment, there exist other options that the respondent from the qualitative study did not identify or disclose during the interview.

In order to increase the popularity of VR, and given any resources of their choosing, there were differences in which areas the qualitative and the quantitative study would spend those resources. For example, in order to increase the popularity of VR, our respondent from the qualitative study would focus on creating opportunities to try the VR-devices before purchase. This, as well as focusing on creating an appealing design and improving comfort of the devices would be her main focus. The quantitative study had the same question, however

they would focus mostly on marketing, spend more on entertainment as well as improving

software related to education. It is worthy to mention that the quantitative study did not have

the option to choose to spend money on creating opportunities to try the VR-device before

purchase, as they had to pick from a set-list and not be able to speak freely.

Now that we have uncovered the main differences between the qualitative and the

quantitative study, there has also been identified several similarities in the responses, which

could be interpreted as a takeaway and deemed true in terms of this thesis, and used as a basis

in proving/disproving the hypotheses.

In both studies, there is a relatively young respondent profile. In the qualitative study

the subject is 22-years old, and in the quantitative study the severe majority is under the age

of 34. As we have already uncovered there is a higher probability that two respondent profiles

with a similar age would share opinions rather than two respondent profiles that have a big

discrepancy in age.

In the quantitative study, 60% of the respondents have tried VR, and our respondent

from the qualitative study has as well. However, she does not own a device personally, which

allows her to speak from experience, as well as be on the "potential customer" side of

individuals that do not own a device.

Based on the mediums that we published the survey in, there is a high probability that

the severe majority of the respondents are based or at least familiar with the Norwegian

market in terms of VR. Similarly to the respondent profile from the quantitative study, the

respondent from the qualitative study is also based in Norway, and has experience and insights regarding the Norwegian market specifically.

Similarly for both sides, neither has any real experience using AR-devices, and therefore can not offer real insights as the majority of the subjects does not know what AR-devices are.

Similarly, gaming and entertainment were identified as the most popular usage area for VR for both the qualitative and the quantitative study, but they also scored well in terms of education and work, in which the respondent from the qualitative study also mentioned.

Importantly, when it comes to challenges both of the studies agree that the initial price of the purchase is too expensive. They also agree that not having the opportunity of trying a device before purchasing it is a relatively big issue. These two combined makes up for the biggest challenge that VR-faces, which is its very high price barrier for the consumer.

Lastly, the results from both the qualitative and the qualitative study tells us that VR has not done as well as the respondents had originally thought the first time they heard about VR. However, they do agree that VR still has a high growth potential, given that VR can adapt into the right industries, and improve software related to education, work, as well as entertainment.

Hypothesis testing

Going back to the seven hypotheses we developed earlier, by formulating the questions in both the qualitative and the quantitative study in a specific manner to help us prove these hypotheses true or false. Now that we have analyzed the results it is time to

evaluate each statement, as well as a short summary on why it has been proven TRUE or

FALSE:

H1 - The majority of the consumers have heard, and are familiar with VR-technology.

With an overwhelmingly positive awareness towards VR technology, and an

impressive 97,8% of the respondents from the quantitative study, as well as our respondent

from the qualitative study having knowledge about VR-technology, we can say that the broad

majority or the consumers have heard, and is familiar with VR-technology. Therefore, we can

prove H1 to be TRUE.

H2 - The majority of the consumers have heard and are familiar with AR-technology.

Compared to VR technology, AR is not as popular. 37,8% of the respondents were

familiar with the term, but the majority was not. Also, a combined percentage of 82,2% of the

respondents had not or was not sure they had ever used an AR device previously. So it is safe

to say that the majority of the consumer had not heard or were familiar enough with AR.

Therefore, we can prove H2 to be FALSE

H3 - VR/AR is not performing as well as forecasted within the Norwegian market.

Both the qualitative and quantitative study was presented about this question, and they

did both agree that VR, as well as AR did not perform as well as expected and was originally

forecasted within the Norwegian market. Therefore, we can prove H3 to be TRUE.

H4 - The VR industry has a high growth potential.

Both the qualitative and quantitative study was presented with this question, and there was a mutual agreement that VR had a high growth potential, given that the industry develops in a positive way. Therefore, we can prove H4 to be TRUE.

H5 - There are still areas and industries where VR would have high potential.

There was a mutual agreement from both the qualitative and the quantitative study that there were still industries and areas in which VR-technology would have a positive future, and possibilities that had not been explored or invested in sufficiently. Therefore, we can prove H5 to be TRUE.

H6 - The price of VR-devices is in a good spot.

Both the qualitative and quantitative study mentioned the price of acquiring a VR-device to be one of the two biggest barriers for popularizing VR-technology. The purchasing price, combined with a limited opportunity to try any device before purchase was considered to be the two biggest negative factors. The studies agreed that the price was not in a good spot, and that it was too expensive. Therefore, we can prove H6 to be FALSE.

H7 - As VR grows, so will AR.

Only the quantitative study got this question, but the score reflected a slight agreement that AR and VR will grow in tandem with each other, and that if there is a growth within the VR-industry, the AR-industry will be impacted in a positive way as well. Therefore, we can prove H7 to be TRUE.

Discussion

Overall reliability and validity

This study aimed to investigate which key factors are contributing to the performance of the VR/Ar industry, compared to what has been forecasted and expected within the Norwegian market specifically. The purpose of this is to shed some light on what specifically is missing for the VR/AR industry to become popularized in the Norwegian market. Using data collected from both a quantitative and qualitative study and comparing the data, we feel confident that the insights that have been presented will be a solid foundation to base the interpretation of the hypotheses on.

As this study is not created with a LIKERT-based design, measuring the reliability and the validity of the survey was very challenging. Converting the results into numerics would have been optimal, both for measuring the validity as well as the reliability. However, we did have some questions that were able to be measured in terms of measuring the validity. The KMO was measured to a .482 which is relatively low, and indicates that the data collected was not very well suited for factor analysis in the first place. However when we look at the extracted communalities all around, except for the question regarding price which was measured to a .440.

Findings

The main purpose of this study has always been to answer the research question: Why is the VR/AR industry not performing as well as forecasted within the Norwegian market? And if that even was the case. We identified quickly that the VR/AR industry was not performing as well as forecasted or as expected by many of the respondents, and then attempted to figure out which factors contributed the most to function as a barrier for the

mass consumption of VR/AR devices in the Norwegian market. Normally, a sample with 45 respondents would not be classified as a large enough sample to measure the population of the entire country of Norway. However, due to a combination of using the qualitative data and the quantitative data and comparing the results, a stronger foundation for evaluating the hypotheses.

We created seven different hypotheses based on secondary data as well as general assumptions, and used the data from the qualitative and the quantitative study to create insights. These insights were then used to prove these seven hypotheses either true or false. Most of our hypotheses were met, with five of them proven true, and two of the hypotheses were proven wrong. We did expect six of the seven hypotheses to be proven true, with the expectation that H6 regarding the price would be proved false, but H2 was not expected to be proven false. H1, H3, H4, H5 and H7 were all proven true.

Our findings also fit with the theory that price being one of the main barriers for the mass consumption of VR for the general consumer.

Limitations

During this study, we faced multiple limitations and challenges, and this was mainly due to some minor flaws in the study design.

First of all, the format that the quantitative study was made in, was not a LIKERT-scale but was created to gain more insights even though it was a quantitative study. Due to this, we were able to get a deeper insight into the respondents' opinions, but it did come with a tradeoff. Due to the design not being in a numerical scale, transferring the data

into SPSS and running the statistical analysis such as regression, validity, reliability, etc. was a massive challenge. As the regression analysis was not feasible at all, and only some of the questions were able to be analyzed using the SPSS software the validity and the reliability of the quantitative study is suboptimal.

Due to the mediums at which the quantitative study was published, many of the respondents are relatively young as was reflected in the respondent profile. This creates the limitation that this study can not tell us what an older respondent profile would respond, and only reflects the opinions and experiences for a young respondent profile. As we have identified a correlation between age and the willingness to be early adopters for new technology, it is expected that an older respondent profile would have made a difference in the results.

The last limitation that was found was the lack of knowledge about AR, the general awareness of AR was not up to the level of expectation, as the respondent from the qualitative study had not heard of it the topic of AR had to just be abandoned, there was also little awareness of AR in the quantitative study, leaving a weak foundation to build up any reasonable insights regarding AR-technology.

Conclusion

Consumer insights

First of all, the study demonstrates a correlation between age and early adopters, as well as a correlation between the amount of users that had never tried VR, and found that it increased dramatically with age. This data suggests that new technologies such as VR/AR are

more likely to be used, the younger the consumer is, given that they are 16 years or older of course.

Five of the seven hypotheses were proven true. We found that the majority of the consumers had heard and were familiar with VR technology. This is a very positive thing as it is very challenging to increase the consumers' awareness or "educate" them on new technologies as advanced as this.

We also found that the VR industry has a high growth potential, as well as there still being industries and areas where VR has high potential that is not being utilized enough at the moment such as education, work and entertainment.

It was also identified a slight correlation between the growth of VR impacting the growth of AR, and there was a general agreement in the responses in the quantitative study that as VR grows, so will AR.

The most important hypothesis that we formulated was H3, and that is directly linked to the research question: VR/AR is not performing as well as forecasted within the Norwegian market. Both the qualitative and the quantitative study agreed that VR and AR did not perform according to expectation, and the success that it was originally forecasted to have in the Norwegian market was not up to the level of expectation.

The main reason for this is highlighted in H6, regarding the price of VR-devices. There is a mutual agreement between the quantitative and the qualitative study that VR

-technology has a very high purchasing price. This, combined with the limited ability to try a

device before purchasing leads to very high barriers for acquiring a VR-device.

The study also found that entertainment/gaming was by far the most popular usage

area for VR, but that work and education was considered as areas that VR could be used.

Unfortunately AR did not get as much focus as VR did in this study, as it was found

that the general awareness of the term AR was little, too non-existent in a significant amount

of the respondents both in the qualitative and the quantitative study. This led to us not having

a reasonably strong foundation to collect insights on a basis that was reliable enough and

could be generalized into a statement regarding the market's attitude towards AR-technology.

Therefore, the AR-section of this study is not as reliable as the VR-technology section, as

there is a massive discrepancy in the respondents' experience with VR compared to AR.

Recommendations

Overall, the evidence is pretty clear. In order to popularize VR and become a

household device, the companies creating these devices (META, HTC, etc.) need to be able

to reduce the purchasing price of the devices. This could be done in multiple ways, either by

identifying a way of cutting production cost - and thus lowering the price to the end

consumer, or it could be done by lowering the profit margin, or even selling the devices at a

loss to penetrate the market. However, the price was only one of the issues, another factor

that was expressed is the opportunity for the consumers to try a device before purchasing. At

the moment, consumers have to rely on having friends or family owning a device and trying

it with them, or just relying on a word-of-mouth type of marketing from influencers or

family/friends. Although this is a very strong method of marketing, WOM does not work optimally if not enough consumers are already owning a device, and have a network to speak about it. The companies creating these or selling these devices need to open up the possibility for the consumer to try a device before purchasing. The last thing that the companies that produces these devices need to to, is to focus on improving the software mostly related to gaming/entertainment, as that was measured to be the most popular usage areas, but also software related to education and work, as this is also areas that the consumer sees VR as a potential area to use it in.

Future research

Future research into this industry should focus on having a sample size and a respondent profile that is more spread out in terms of age, as age is a big factor when it comes to the adoption of new technologies. Furthermore, as VR is perceived as a high-potential industry and already having a massive yearly growth in sales of devices, it is reasonable to believe that studies conducted in the future will have a sample size with more people owning VR-devices, thus creating samples with more people having experience with VR, compared to talking about VR whilst never having tried it.

Future research into this topic should include a bigger sample size, and should also be conducted in different markets, not just the Norwegian market. This must be done in order to investigate whether there are noteworthy differences in attitude between countries and cultures, and whether or not the VR and AR technologies are more widespread worldwide compared to the Norwegian market.

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Appendix

Appendix A - In-depth interview guide

What do you consider to be the biggest challenges that VR technology faces within the

Norwegian market

1.   What is your first name?

2.   How old are you?

3.   What do you know about VR-technology?

4.   What do you know about AR-technology?

5.   Have you ever used VR?

6.   If yes, what did you like the best/least about it?

7.   If not, what would it take for you to use VR/Ar technology?

8.   Today's VR-goggles are just about 4000 NOK and above, what do you think about this

    price?

9.   How do you see the situation of VR/AR in the Norwegian market today?

10.   How do you see the situation of VR/AR technology today, compared to your

    expectations the first time you heard about VR/AR?

11.   What are your thoughts about the future of VR-technology?

12.   What are your thoughts about the future of AR-technology?

13.   Which of these two do you think has the brightest future?

14. In which areas do you imagine VR being used in the future?

15. In which areas do you imagine AR being used in the future?

16. Which thoughts do you have about marketing for VR/AR?

17. Which other possibilities do you see for VR/AR tech, now or in the future?

18. What do you imagine are the biggest challenges that VR/AR faces?

19. How would you proceed to increase the popularity and interest regarding VR/AR technology?

20. Have you any other thoughts regarding the topic that I have not asked about?

Appendix B - Transcript - In-depth interview.

Transcript Interview 1 - Woman, 22 years old, IT/Computer Sciences.

Interviewer = I

Subject = E

I: there we go, first of all thank you for participating in this study.

E: No problem.

I: I sent you a document yesterday, I don't know if you read that?

E: Yes, I read it yesterday.

I: and you understood it?

E: yes.

I: good, let's start out with that, so i guess we'll just jump straight into it. So I guess first of all
I just wanna hear a little bit about you. What's your name and how old are you?

E: My name is Emma, and I'm 22 years old, and I study information science in Bergen,
information science.

I: PErfect, so are you familiar with VR technology? and what do you know about it?

E: I am familiar with it, I've tried it once or twice, but I don't really know much about the
technologies behind it. All I really know is that it's a platform that can be used for
gaming, and that's basically it.

I: yeah, perfect, so how about AR, have you ever heard about that?

E: no, never heard of it.

I: Ok, so you had used VR before?

E: Yeah.

J: what pulled you towards using it, or what did you like the best about it?

E: Well I really didn't enjoy it that much, I think it was a bit weird not knowing where you are in the room, it kinda confuses you. but it was basically just a family friend who had bought it and said you should try it, so i tried it but it freaked me out.

I: yeah i can see that, did you use a full helmet or just the goggles?

E: Just the goggles, and two controllers in each hand.

I: So you didn't enjoy the experience in general? Were there any aspects of it that you liked or did you dislike?

E: Well, I did two things in VR. The first one was sitting on a rollercoaster which freaked me out because it felt real. and then the other thing was a game where you have to hit blocks, to like a song, which was OK, but it was kind of hard to understand and actually do it well. you have to practice, I think.

I: PRobably, so like in general, what would it take for you to use VR goggles? is it like the helmet itself or is it the experience that you don't feel that you know where you are basically? What do you think for you it would take?

E: for me it would probably be like if there was a game that i would find very interesting, or a game that i know then get adapted into VR. For example, playing Call of Duty would be cool in VR in my opinion. but also the ability to connect with different friends, like

online, if that was possible.

I: like a social media gathering or something?

E: not social media, just like a gaming hobby, being connected with friends would be…

J: just being social and playing with friends?

E: Yeah.

J: So right now, the VR goggles, at least in Norwegian Kroner are right around 4000, and that's like the low-mid end goggles, and the more expensive ones are a little bit more expensive than that. What do you think about the price?

E: it is quite expensive, but I understand why it is expensive because of the technology that goes behind it. Well I do think that it's a drawback considering that it is quite new technology and people aren't familiar with it, for example buying a gaming console like a playstation or xbox, it has been around for many generations and it just gets updated. so the people buying the product know what they are getting, kind of, but with VR it is kind of unknown. But to me, I wouldn't buy it because it is expensive and unknown.

I: like in general, how do you see the situation of VR in the Norwegian market specifically today, is it like a lot of your friends use it or, what do you think about it in general?

E: I have no personal friends that use it, except for that family friend that bought it, but after half a year they got sick of it and then sold it. So I dont think it's something that has caught on, at least not in my friend group.

I: Like expected like the first time you heard about VR compared to today, where do you

think it is, is it more or less successful than you would have expected it to be when you first heard about it?

E: its been less successful than i thought when i first heard about it. but i think that's mainly because people, i dont know im categorizing people very much here. In my experience people like what they like, and kind of get scared of new things. so VR being quite new, and quite different to other gaming platforms using it for gaming, I don't know what else you could use it for. that it kind of makes sense to me that it hasn't quite caught up with the rest of the things that are sold out there.

I: you keep saying that you think Vr is relatively new, if you were to guess, when would you think, what year would you think that Vr became "popular" in your eyes? when you say it's new, how new do you think it is? How many years has it been around?

E: probably 2015-2016.

I: Yeah okay, so like in general about the future of VR, what do you think about that?

E: I think VR can have a future if it adapts into different elements because I think of examples like educational purposes that could be good. like a simulator of some kind for different studies or different job opportunities, that could be a way of practicing and testing in some sort of way. but that's mainly where i see it going.

I: fair enough, that's a good answer. so then you covered that question. because that was actually my next question. What do you think is the biggest challenge that VR faces? at least in the Norwegian market in general?

E: probably the cost, and that it is unknown and that it can cause people don't have the ability to test them before they are used. you kind of have to buy a product that someone tells you

about. but you don't really get the experience before you actually buy it, take it home and try it for yourself.

I: going a little bit off the guide here, but a couple of weeks ago it was announced that META, or Facebook what its called before they have been going hard on this VR trend, and it was announced that they would open physical stores for you to be able to try VR, what do you think about that addition to the industry?

E: That's better than expected. because i think if people get to try them in a store there's more possibilities of them liking it and wanting to have it for themselves. so it sounds good if that is able to happen. but then it's like: okay where are these stores going to be located, will they be located all over the world or mainly in the states?

I: we don't know yet, we will have to see, but in general you like the idea?

E: Yes.

I: what would you personally, what would you do to increase the popularity of VR?

E: what would i do …

I: if you had limitless resources, which steps would you do, do you think?

E: Hmm that's a good question, if i had unlimited resources then i would try and make sure that META makes it possible for people to try them before buying them, make a design that is appealing and comfortable because that is important when it is physically on you. it's not just a controller that's gonna be in your hand. I can't really think of anything else.

I: that's a great answer, but now we have covered most of what i was wondering about, it's not a very long questionnaire, but the last question is generally like, is there something that i have

not asked about that you thought about when talking about this topic or anything else about VR or AR in general. I know I didn't talk too much about AR but that's mainly because you had not heard about it. so that's fair enough. So is it any other thought that you have?

E: I think you have done a good job of covering all the bases of VR, and what is expected to be asked in a survey about VR glasses, so I'm happy.
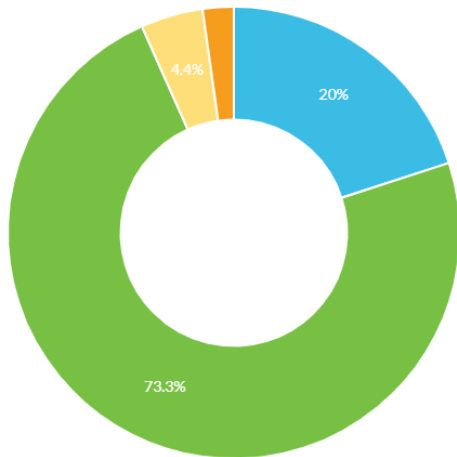
I: good, so then i would like to thank you for participating, and i really appreciate your efforts and taking your time off.

E: no problem.

## Appendix C - Quantitative survey responses

Question 1 -

Q1   Please select your age group:
     Multiple Choice

Choice	Total
0 - 15 years old	0
16 - 24 years old	9
25 - 34 years old	33
35 - 44 years old	2
45 - 54 years old	1
55 - 64 years old	0
65 - 74 years old	0
75 years old and above	0

Question 2 -

Q2   Please select the option that best categorizes your current or most recent occupation:
     Multiple Choice
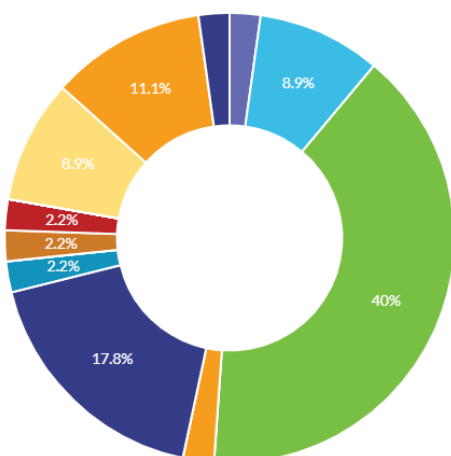
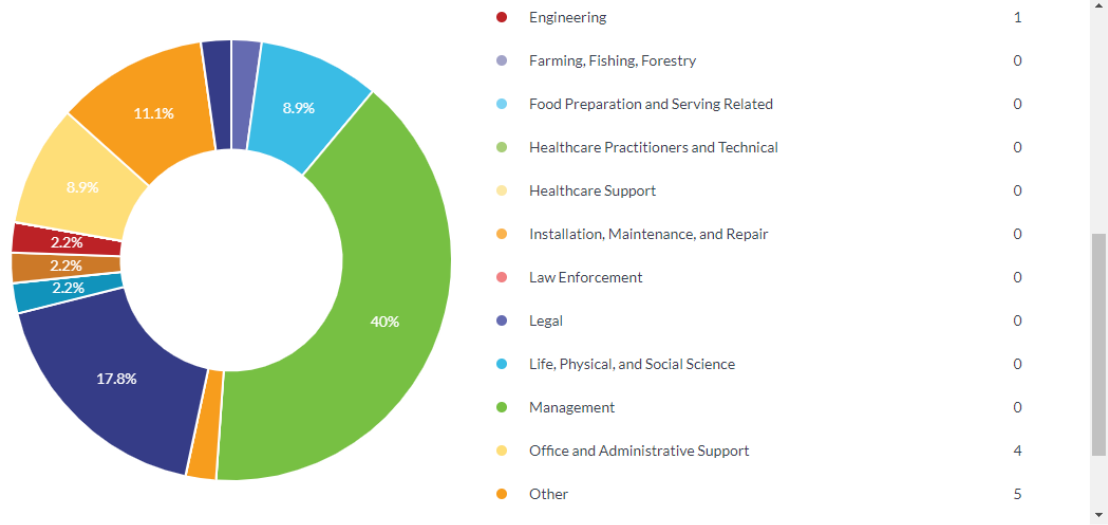| Choice	Total
Unemployed	1
Student without part-time Job	4
Student with part-time Job	18
Architecture	0
Arts, Design, Entertainment, Sports, and Media	1
Building and Grounds Cleaning and Maintenance	0
Business and Financial Operations	8
Community and Social Service	1
Construction	0
Computer and Mathematical	0
Education, Training, and Library	1

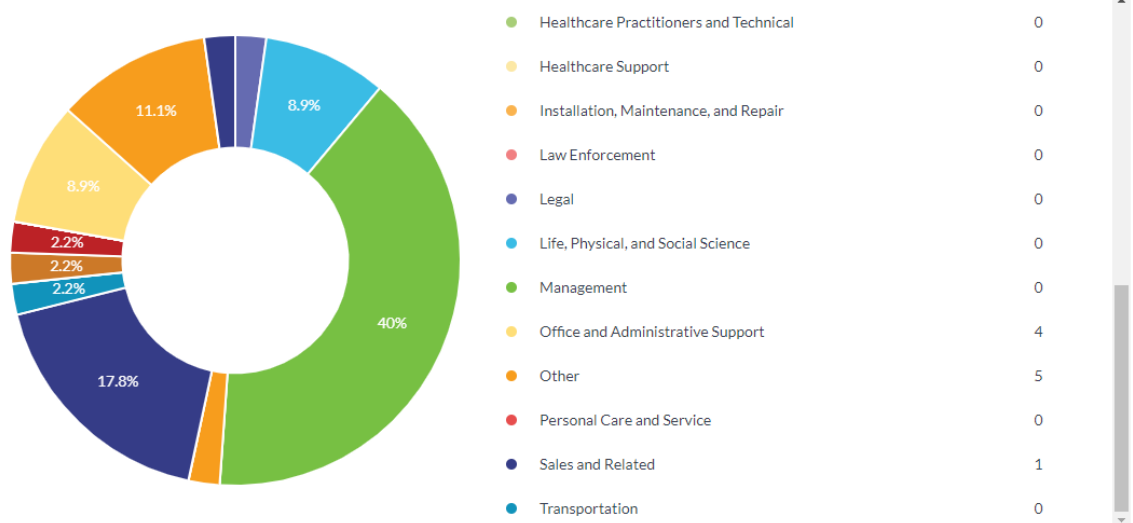Please select the option that best categorizes your current or most recent occupation:
Multiple Choice

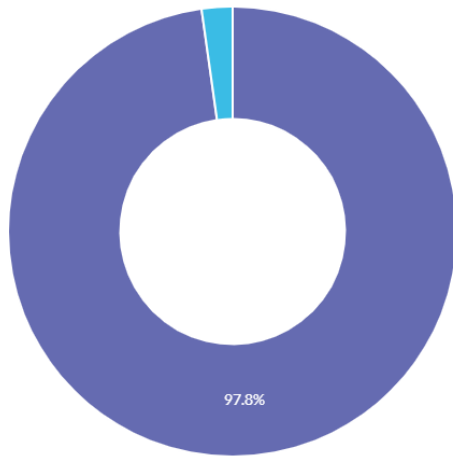|		
●	Engineering	1
●	Farming, Fishing, Forestry	0
●	Food Preparation and Serving Related	0
●	Healthcare Practitioners and Technical	0
●	Healthcare Support	0
●	Installation, Maintenance, and Repair	0
●	Law Enforcement	0
●	Legal	0
●	Life, Physical, and Social Science	0
●	Management	0
●	Office and Administrative Support	4
●	Other	5

Q2 Please select the option that best categorizes your current or most recent occupation:
Multiple Choice

●	Healthcare Practitioners and Technical	0
●	Healthcare Support	0
●	Installation, Maintenance, and Repair	0
●	Law Enforcement	0
●	Legal	0
●	Life, Physical, and Social Science	0
●	Management	0
●	Office and Administrative Support	4
●	Other	5
●	Personal Care and Service	0
●	Sales and Related	1
●	Transportation	0

Question 3 -

Q3 Are you familiar with the term VR? (Virtual Reality)
Multiple Choice

Choice		Total	
● Yes		44	
● No		1	

97.8%

Question 4 -

Q4 Are you familiar with the term AR? (Augmented Reality)
Multiple Choice
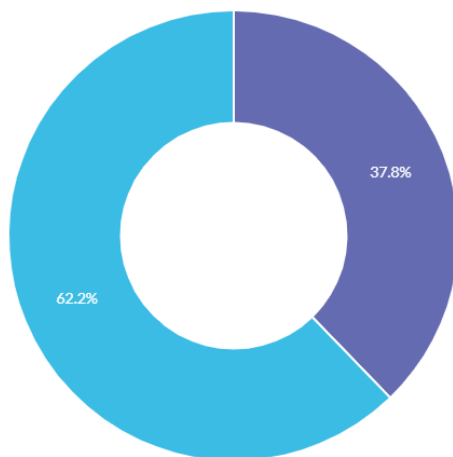
Choice		Total	
● Yes		17	
● No		28	

37.8%

62.2%

Question 5 -

Q5 **Have you ever used a VR-device (Virtual Reality)**
Multiple Choice
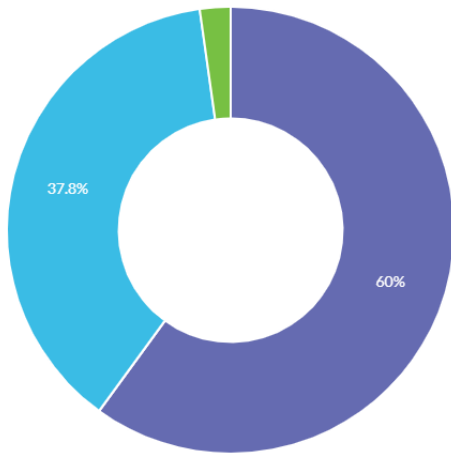
Choice	Total
● Yes	27
● No	17
● Not sure	1

Question 6 -

Q6 **Have you ever used a AR-device (Augmented Reality)**
Multiple Choice
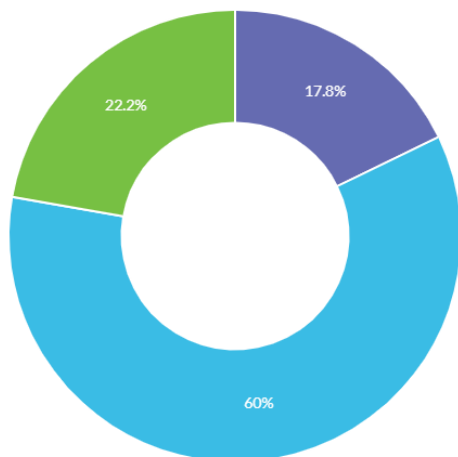
Choice	Total
● Yes	8
● No	27
● Not sure	10

Question 7 -

Q7   **Have you ever considered purchasing a VR or an AR device?**
Multiple Choice

Choice	Total
Yes	17
No	26
Not sure	2

37.8% / 57.8% / 4.4%
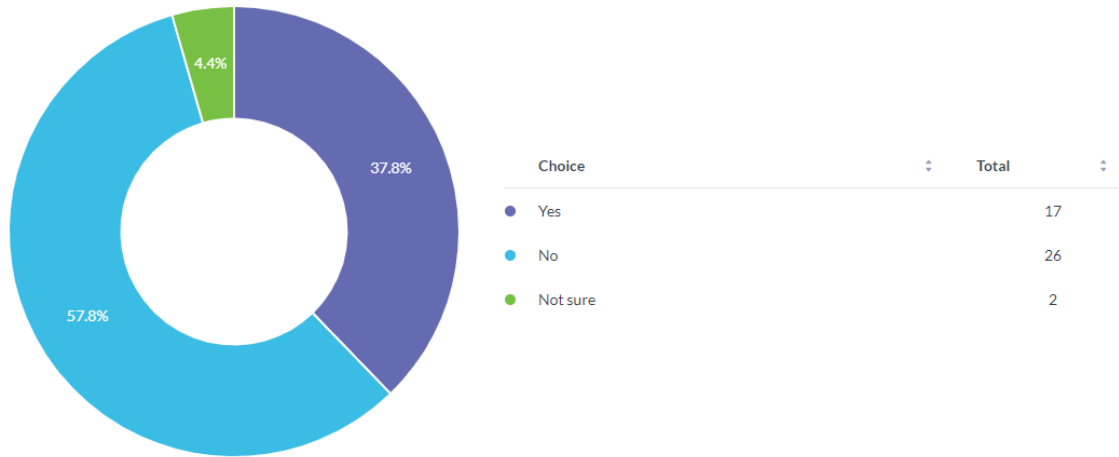
Question 8 -

Q8   **What would you consider a reasonable price range for a VR-device? (Approximately)**
Range

150	218.47	595.84	1500
Lowest	Average Low	Average High	Highest

Min 150   1500

Question 9 -

Q9 If you were to purchase a VR-device, for which purposes would it be used?
Multiple Choice
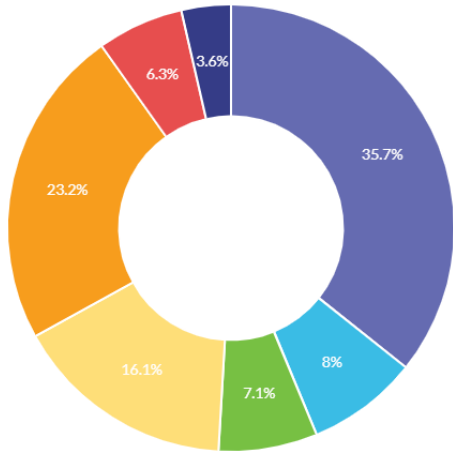
Choice	Total
Gaming	40
Work	9
Education	8
Social	18
Movies/Tv-series	26
Tourism	7
Other	4

Question 10 -

Q10 Please rate the following statements regarding VR:
Scoring
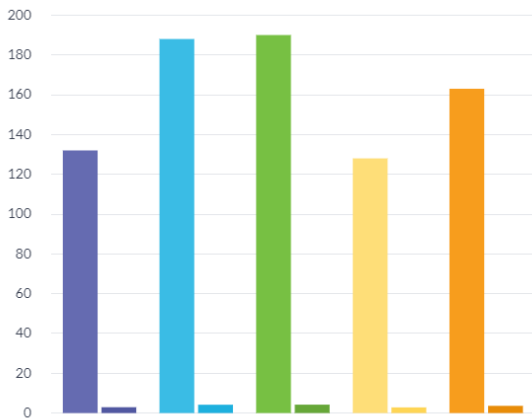
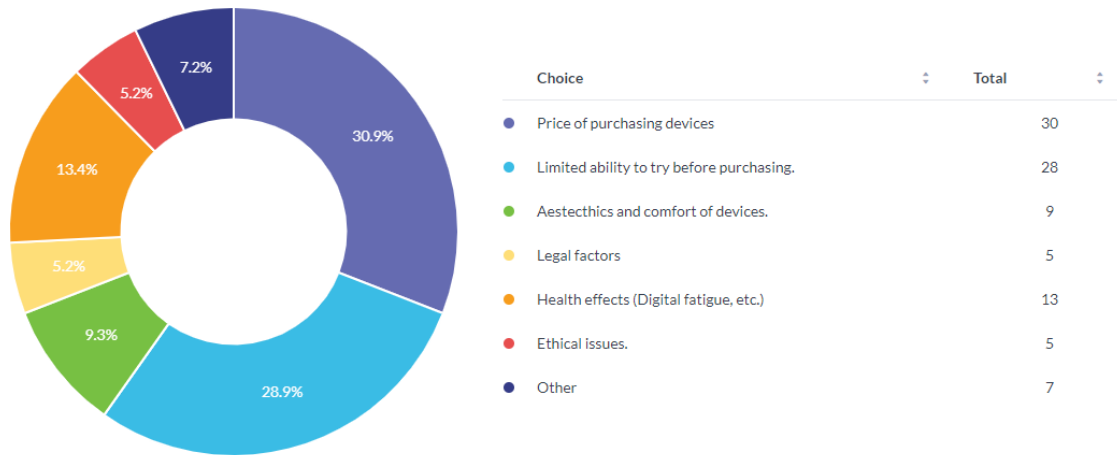| Choice	Score	Average
VR is performing according to what i expected the first time i heard about VR.	132	2.93
The VR industry has a high-growth potential.	188	4.18
There are still areas and inustries where VR would have a high potential.	190	4.22
The price of VR-devices is in a good spot.	128	2.84
As VR grows, so will AR-technology.	163	3.62

Question 11 -

Q11 What do you consider to be the biggest challenges that VR technology faces within the Norwegian market
Multiple Choice

Choice	Total
Price of purchasing devices	30
Limited ability to try before purchasing.	28
Aestecthics and comfort of devices.	9
Legal factors	5
Health effects (Digital fatigue, etc.)	13
Ethical issues.	5
Other	7

Question 12 -

Q12 If you were given the assignment to increase the popularity of VR, which of these areas would you emphasize the most?
Multiple Choice

Choice	Total
Marketing	28
Increasing social value	17
Publishing tutorials	6
Expanding to new industries.	17
Gaming	24
Entertainment (Exclusive movies/TV-series)	24
Improving software related to Education	18
Increased opportunities for Tourism.	8
Other	2