

# VIRTUAL REALITY IN MARKETING

– AN EXPLORATIVE STUDY

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**Abstract**

Recently, virtual reality (VR), as a new form of technology is developing and evoking public interest. VR technology can provide an artificial realistic environment controlled by body movements. The technology has been applied in many areas for example movies and other entertainments. It provides interactive experiences and it is still developing to many other new fields like medicine and the military.

It is exciting to look into how virtual reality technology can be helpful to some new areas such as marketing. The purpose of this thesis is to try to find out whether virtual reality technology, as a marketing tool, can attract customers' attention more than traditional marketing tools.

We choose IKEA as an experimental case study has been chosen as method for doing this research. We use IKEA's virtual reality application on the Steam to do the experiment. IKEA is a big Swedish furniture retailer, which has stores all around the world. IKEA virtual reality application is a simulation of a kitchen environment. In the application, users can interact with virtual items such as cooking a meal with pan and meat balls. The application is available on the Steam, a digital distribution platform used for e.g. digital gaming. The thesis first introduces the background of virtual reality technology and marketing theory and then, analyzes marketing through virtual reality. We believe that the result of our experiment with IKEA's application can be used as a reference for other companies.

**Keywords:** Virtual Reality, Marketing, Marketing Tool, Human Computer Interaction



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## Table of Content

1 Introduction .....	1
1.1 Background .....	1
1.2 Future development and opportunities.....	1
1.3 Purpose.....	2
1.4 Research question.....	2
1.5 Structure .....	3
1.6 Limitation.....	3
2 Theoretical Framework.....	5
2.1 Marketing.....	5
2.1.1 Definition of Marketing.....	5
2.1.2 Marketing Tools.....	7
2.1.3 The Process of Marketing.....	8
2.2 Virtual Reality.....	9
2.2.1 The Emergence of Virtual Reality.....	9
2.2.2 Recent Development .....	10
2.2.3 Virtual Reality in Business.....	10
2.3 Virtual Reality Marketing and Retailing .....	11
2.4 Human Computer Interaction .....	12
2.4.1 Introduction to Human Computer Interface .....	12
2.4.2 Development of HCI .....	13
2.4.3 HCI in Virtual Reality .....	14
2.4.4 HCI in busniess.....	14
2.5 IKEA .....	14
3 Method.....	16
3.1 Research Approach .....	16
3.2 Experiment Purpose .....	16
3.3 Research Design.....	17
3.3.1 Experiment design .....	17
3.3.2 Interview Design.....	18
3.3.3 Exhibition of device .....	19

3.4 Data Collection.....	20
3.5 Credibility.....	20
4 Results.....	21
5 Analysis and Discussion .....	23
5.1 Time Analysis .....	23
5.2 Interview Analysis .....	23
5.3 Participant's Reactions Analysis .....	24
5.4 Human-Computer Interaction.....	25
6 Conclusion and Further Research.....	26
6.1 Conclusion .....	26
6.2 Further Research .....	26
Appendix	
Reference List	

# **1 Introduction**

## **1.1 Background**

Virtual reality (VR), according to Lowood (2017), indicates that a person can interact in an artificial three-dimensional environment created by using computer software and physical tools. These tools consist of several parts e.g. controllers and headset. Controllers help users to interact with virtual items, characters and environments. The headset gives an immersed experience. VR has attracted public attention in recent years and its history could trace back to the last century. When VR was put forward, people realized its large potential and had many expectations about it in different fields like training, education and business. However, considering the inconvenience of virtual reality devices in the past, such as high cost, heavy weight and large size, VR could not be widely applied in many fields.

From the last century, the digitalization has changed the traditional business model and evolved many new businesses. For instance, Online to Offline (O2O), a business model adopting digital marketing to make consumers purchase from physical business (Wayne, 2015). The development in computer technology in recent years makes virtual reality devices much lighter, smaller and available for everyone. These factors stimulate people's interest in the potential of VR again. Many companies have begun to develop and try to adopt this technology to their business. IKEA, a Swedish company which designs and sells ready-to-assemble furniture, which is the world's largest furniture retailer as an example, developed a beta application on a computer platform. EBay, an American multinational corporation and e-commerce company, created the first virtual reality department store for smart phones (Korolov, 2016).

## **1.2 Future development and opportunities**

Virtual reality has great potential in many areas such as design, medicine, education and business. However, due to the limitation of virtual reality devices, this technology is restricted, so that it cannot be widely spread and applied to all activities. If people wanted to try to use and experience virtual reality, it could only be done through some specific institutions that could afford these heavy, big and high-cost devices.

Now many computer firms design and put forward a new generation of virtual reality device which not only are much more advanced and much smarter but also are smaller, more functional and much easier to set up and operate. This new generation of virtual reality device enables consumers to experience a virtual world on their own. With the

help of these new generation virtual reality devices, more people can enjoy the benefits that these devices offer.

To designers, virtual reality provides them with a new approach to design, especially in designing for instance complicated engines. A report points out that, many designers use Classical computer aided engineering (CAE) software for their design work. CAE software has certain limitations, but virtual reality can provide the designer with a more comprehensive vision of the object they are designing (Ingrassia & Cappello, 2009). There is research that proves the effect of applying VR to designing. With the help of virtual reality, designers can increase their knowledge and understanding about design so that they can create much more effective designs with less mistakes in less time (Pitt et al, 2005).

In the area of medicine, research says that it cannot prove that virtual reality as a tool is as effective as traditional methods but still it is a promising technology (Shuchat, Ouellet, Moffat and Belleville, 2012).

Virtual reality can also be applied to training, for instance, flight simulators which are used to train qualified pilots. In these simulators, people can create an environment which is similar to the cockpit of an aircraft in the real world. There are two aspects to reflect its importance. One is that these kinds of simulators can help to train and evaluate a pilot's capability and technique. The other one is that it can help the pilot to be familiar with a new plane (Vince, 1998 & Mellet-d'Huart, 2009).

### **1.3 Purpose**

We have found few investigations have been done regarding VR as a marketing tool. In this thesis, we will be focusing on virtual reality technology in the promotion stage of marketing and the ambition is to find out whether virtual reality is a more effective and better marketing tool to increase customers' interest compared to the traditional ones such as an online catalog.

Our purpose is to find out whether virtual reality is helpful for consumers to learn the products, and if consumers will get a feeling of convenience while using virtual reality.

### **1.4 Research question**

By giving the introduction above, we are interested in finding out the potential of virtual reality in business. We want to investigate virtual reality as a tool in marketing.

Our research question is as follow:

Can a virtual reality application, as a marketing tool, increase customers' interest compared to an online catalog?

## 1.5 Structure

This thesis is structured in six chapters as expressed in the following illustration and thereafter each chapter is shortly described:



### Chapter 1: Introduction.

This chapter introduces the general background of virtual reality technology and marketing. It also explains the reason why we got interested in this area. In addition, we describe the purpose as well as raise the research question.

### Chapter 2: Theoretical Framework

This chapter explains some concepts involved in this research which consist of marketing theory and human computer interaction theory.

### Chapter 3: Method

This chapter introduces the methods we have chosen for our research. It includes research approach, research design and credibility. This chapter presents the process of applying an experiment and interview. Moreover, it also shows how to collect data and how to analyze it.

### Chapter 4: Result

Chapter four shows the findings that are collected from the experiment.

### Chapter 5: Analysis and Discussion

In this chapter, an analysis is conducted by comparing the data collected from interviews and experiments. The findings of our research will be analyzed in association to the theoretical framework.

### Chapter 6: Conclusion

This chapter draws the conclusion of this research. Also the answers to the research question will be given. In addition, suggestions for further research are given.

## 1.6 Limitation

We will use IKEA virtual reality application and IKEA 2017 online catalog in our experiment.

IKEA virtual reality application is a beta test version. It already has advanced functions to produce a fairly good experience of a real environment but it is still not perfect. The items and interactive products are few and the system is not stable.

The purpose of this thesis is to investigate whether virtual reality is a more effective and better marketing tool to increase customers' interest compared to the traditional ones. Actually, we will not look deeply into the principle of virtual reality technology nor its software and hardware. However, business and marketing theory will play an important role in this thesis to complete our research.

## **2 Theoretical Framework**

In this chapter, the theoretical framework of this thesis will be presented. It consists of concepts related to our thesis.

### **2.1 Marketing**

This part contains definition of marketing, marketing tools and the process of marketing.

#### **2.1.1 Definition of Marketing**

Many people think marketing means sellers promoting companies' products and services to customers by using some technique, so that companies can make profit. However, previous studies have indicated that the definition of marketing is quite broad (Lee, 2013). According to Hibbard (2017), marketing is a series of activities involved in directing the flow of goods and services from producers to consumers. Lee (2013) indicates in her article "Marketing can be more broadly understood as the communication channel linking a product or service to the targeted customers (or patrons)" (p.169). The purpose of business is not making profits, but "to create and keep customers" (Tracy, 2014). Tracy also points out making profits is the consequence of attracting customers' interest, create customers and keep their interest on companies' products and services.

It is quite common that people think marketing is just advertising, promoting and selling. But this kind of view is incorrect. The whole marketing activities includes the process both before and after sales activities, such as analyzing market, identifying the marketing segment and customer service.

#### *The birth of marketing*

The concept of marketing originated in United States in late 19th and in the 20th century. At first, marketing focused only on gathering information about the market and analyzing these data. People still regarded it as a part of selling. Marketing only existed in universities. With the development of technology, the existence of mass media, and the growth of economics, the function of marketing became more and more important. Companies in America began to apply marketing to their operations and sales, which meant marketing was not just a course in American universities any longer and it had raised and attracted interest of the whole industry. But, at the same time, marketing still had its limitation and just focused on the field of physical products, and researched how to make promotion and advertisement.

### *Traditional marketing theory*

The period from the birth of marketing to when marketing raised public interest is called the period of traditional marketing theory. During this period, people thought marketing began after the producing process and was finished when products were delivered to consumers. The marketing strategies were producer-orientated and the aim of these strategies was making profits.

### *Consumer-orientated marketing*

After 1950s, traditional marketing began to change and transfer to be consumer-orientated and the concept of marketing expanded to the whole process, including analyzing market environment, identifying consumers' needs, making marketing strategies, delivering products and customer services. In 1960s, marketing became an independent science combined with management theories, psychological theories etc.

In order to conduct a successful marketing, marketers need to understand customers' needs and grasp the market environment first, so that companies have to conduct many marketing investigations and research by using different kinds of methods such as interviews and questionnaires. Then companies will make marketing strategies according to these data. There were many different kinds of methods, such as the 4Ps theory (product, price, promote and place), proposed by Jerome McCarthy in 1960 and spread by Phillip Kotler and others. Nowadays, the 4Ps theory has been widely accepted and used (Constantinides, 2006). After sales process, companies still need to pay attention to consumers' feedback in order to keep their interest to products or services.

### *Marketing in Digitalization Era*

Entering 21<sup>st</sup> century, technology has greatly influenced people's life and marketing also has been changed. Following the trend of digitalization and popularization of the Internet, marketing through the internet and website is more and more important. According to Sheehan (2010), the development of online marketing can be divided into several stages and the most noticeable stages are called Web 1.0 and Web 2.0. Web 1.0 can be narrowly regarded as a communication medium. It only allows people to download information and contact marketers. But this kind of interaction between consumers and marketers is mostly linear or one-way communication. However, in the stage of Web 2.0, it enables consumers and marketers to have a real interaction. With the help of powerful search engines and user-friendly interfaces, consumers can easily find the products and information they need and conduct an effective and real time communication. Additionally, it allows consumers to contribute and put their ideas on the internet.

There are four approaches to test whether the marketing strategy is good and successful. First, creating utility, which companies offer their product and service to consumers and

consumers can use them to fulfil their needs and achieve their goals. Second, pricing properly, the price of products should be affordable and accepted by consumers. Proper price can help companies earn market share and even become market leader. Third, customers' reality, marketing strategy should adapt to consumers' both social and economic reality. The final approach is to provide consumers with true value. For instance, IBM not only provides products of good-quality, but also good customer service in security and repairing (Tracy, 2014).

This thesis focuses on studying the promotion stage of marketing. Experiential marketing is one kind of marketing strategy in the promotion stage which focuses on creating experience for their customers through customers' feeling, sight and other sense organs. Experiential marketers regard consumers as persons who are concerned with achieving pleasurable experience (Schmitt, 1999). IKEA adopts this marketing strategy in their physical stores. They create different kinds of real and physical environments to let customers experience and try IKEA's products, so that customers can know features and functions of products. Nowadays, IKEA releases IKEA VR experience application which provides a virtual environment for customers to check and assess IKEA's products. It is similar to experiential marketing strategy in the real world. In the one hand, because of IKEA VR experience application, it enables IKEA to conduct their experiential marketing in a new field. On the other hand, customers can browse and experience IKEA's products in a long distance.

### **2.1.2 Marketing Tools**

Marketing tools means the methods, techniques and materials that are used to promote the sale of goods and services (BusinessDictionary n.d.). There are several different kinds of marketing tools. The definition of marketing tools is broad. In a narrow sense, marketing tools can be regarded as advertising, including advertisements on television or in websites and magazines, catalogues, reports and other kinds of materials which are delivered by companies directly. With the wide-spread of the internet and social media, like Facebook and Twitter, social media has become an important platform for companies to promote their goods and services. For example, Wispa, a brand of chocolate bar produced by Cadbury, the second-largest confectionery brand in 2010, was relaunched in 2007, because of a series of activities on the internet and in social media where consumers demanded to "bring back the Wispa" and now Wispa has become a popular product. Nowadays, most of marketers have realized the importance of the Internet and social media. Many marketers agree that social media create more benefits and are cost-saving. On the other hand, broadly speaking, marketing tools are the methods or the mixes used by companies to analyze the market so that they can take effective strategies, like analyzing market data and market mixes, such as the SWOT model (strength, weakness, opportunity, and threat) which is used to help companies understand the marketing environment, the 4Ps model, as mentioned before, and so on.

Advertising is a component in Promotion, one part of the marketing mix 4Ps (Chunawalla, S.A, 2009). Advertising is used by many companies to sell their products and service. Advertising is a communicative and psychological process. Companies are the source of the messages. They use advertising to deliver the message in a proper way, so that they can attract customers' attention, raise interest, and create desire and motivation of purchasing their products. As mentioned before, companies are the senders of the information.

There are many kinds of advertising methods. It is general for people to see many kinds of advertisement in newspapers and magazines. With the appearance of radio and television, advertisement and products information can be spread much wider and faster in a short time. Nowadays, social media has become the new generation of advertisement platforms and companies promote their products to the customers all over the world and it is essential for companies to consider it into their marketing approach (Erragcha and Romdhane, 2014).

The effective advertising is not only attracting attention from customers, but also raising their interests and leave impressions in their memory unconsciously (Menon and Soman, 2002). They also indicate that, unlike advertising on television or other media, the internet advertising requires and ensures customers to interact and learn more about the products. In their article, consumers show more interests and motivation to learn and get more information about the products on the basis of curiosity. According to their findings, we think a curiosity-oriented advertising strategy is one effective strategy and can create interest and motivate customers to consume.

Menon and Soman (2002) also indicate that time plays an important role in their findings. When consumers read the advertisement, they need time to learn and evaluate products. Too long or too short time both have negative effects on the process of consumers' behavior, even might cause the loss of consumers. Because too short time cannot enable customers to learn and assess products and too long time may make consumers get bored. However, if companies want consumers to join in the interaction with them, companies should try to keep consumers with them as long as they can (Baikie, n.d.).

### **2.1.3 The Process of Marketing**

To release new products or put forward new services, companies should know and recognize market needs. Next step is to create and develop new products and services, according to the market needs. At the same time, companies will make efforts to conduct market forecasting and market investigations. The aim of this step is to further companies' knowledge about the market and collect data. After that, companies will decide their strategies. According to the data collected by investigating, companies will decide their target of marketing and position of their products. When companies make

their strategies, STP strategy is an ideal choice for a company. It consists of three steps, marketing segmenting, targeting and position. After strategical decision, companies will consider tactics, which means what kinds of methods firms should adopt when they promote and compete with other products. The marketing tools which can be used in this step are SWOT analysis, 4Ps and so on. Selling the products or service is not the end of the process. Firms still need to collect data and feedback about the customers' feelings and comments, in order to improve their products and keep competitive advantage of companies.

In Figure1, we conclude the procedure of marketing. The whole marketing process is a loop beginning from recognizing marketing needs.

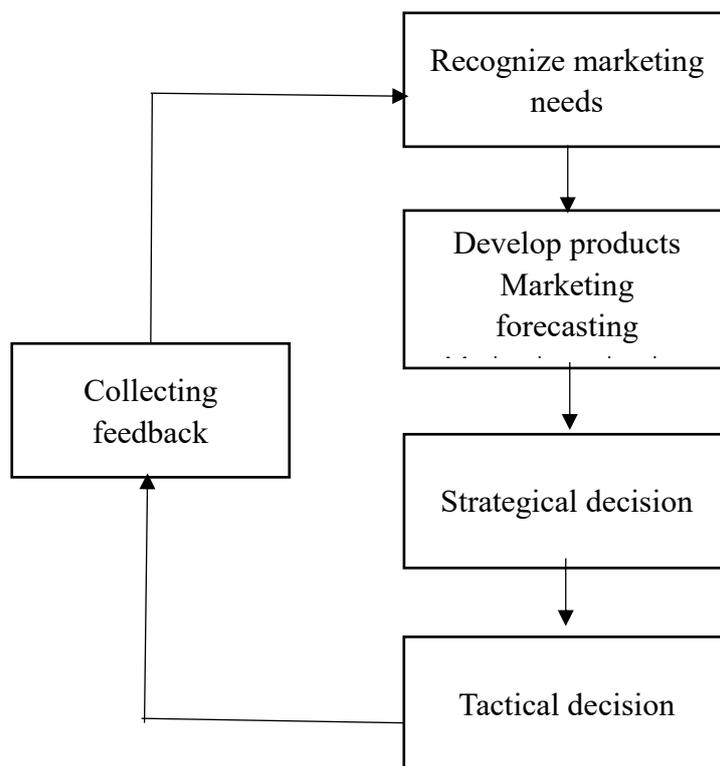


Figure 1: the process of marketing

## 2.2 Virtual Reality

History of virtual reality, its recent development and application in business field will be showed in this part.

### 2.2.1 The Emergence of Virtual Reality

The concept of VR was introduced in the late 19<sup>th</sup> and in the 20<sup>th</sup> centuries. In that time, participants stay in a room with screens around them and films were played on all the screens. With this method, participants could have an experience which was similar to

the virtual reality environment nowadays. The term virtual reality was defined by Lanier in 1987, whose research and work greatly contributed to the development of VR industry (Lowood, 2017). VR was originally used for military purpose during the 1950s and 1960s. According to Lowood (2017), the U.S. Navy and the U.S. Air Force respectively funded different projects in radar warning. With the development and a series of new theories about computer technology, VR became more and more related to human life. At first, the U.S. Air Force applied this technology into military training. With the virtual environment becoming more detailed, people began applying it to entertainment. Different devices were designed for films, theme parks, video games and other entertaining activities. Virtual reality has a great potential from many respects. It has been used in treating psychological disease, like phobia. Ryan (2001) also indicates in an article the potential of virtual reality in education, design, medicine and in the business field.

### **2.2.2 Recent Development**

In recent years, some companies have released VR entertainment devices. For instance, Oculus released Oculus Rift in March 2016, and HTC Vive, developed by HTC and Valve Corporation, was released in April 2016. Although these two devices are mainly run by personal computers (PC) and the price is high, they are a great success and are welcomed by the consumers. Besides, Google, Samsung, Apple and other companies also join in this competition. They have released their own VR headsets, in which consumers have to put a smart phone, which enable people to experience a virtual reality environment by using their smart phones at a low cost.

Due to the great success that virtual reality technology achieved in recent years, some companies try to apply this to other fields like electronic business (e-business) etc. In May 2016, eBay VR department store was released by eBay (an American multinational corporation and e-business company, which is one of the largest e-business platforms), offering a new online shopping experience to customers. In another business area, IKEA, the world's largest furniture retailer, regards VR as a new kind of marketing tool and is developing an application, IKEA Virtual Reality Experience, on a PC platform. In the application, customers can browse and manipulate kitchen furniture and items, from knife and fork to oven and cabinet, and for instance change the color of the virtual kitchen.

### **2.2.3 Virtual Reality in Business**

Due to the great progress that VR made in video game industry, many companies are trying to apply it to their business. For instance, eBay has developed and released a smartphone application called "eBay VR department" in Australia in 2016, which is based on a smartphone platform and was regarded as the world's first virtual reality

department store and more than 12000 products could be found in it. In China, Alibaba offered their VR project “buy+”, in which customers can visit hundreds of virtual store, these stores are created on the basis of what these stores look like in the real world, without leaving their home. IKEA released an experimental PC application called “IKEA VR experience” (Morris, 2016).

The reason why we believe VR technology will affect marketing is not only that some companies have tried to apply it to business, but also there are examples proving that this technology will change marketing and business. The social media changed the marketing environment and many companies regard it as a channel to communicate with consumers. Interaction and communication with client and consumers through a direct and targeted way build confidence between companies and customers. That is the most important reason why companies, no matter multinational or just small business, join in the social media (Samanta. 2012). Compared to social media, not only can VR interact with consumers but also the interaction through virtual reality is more humanized and much closer to human life (Will, 2015).

## **2.3 Virtual Reality Marketing and Retailing**

Virtual reality marketing in retailing can be defined as a kind of marketing method to promote the products by using virtual reality technology (no matter if this technology needs the internet or not).

Jiang and Benbasat (2004) say that in the stage of consumers’ evaluating the products during the decision-making process, there are two types of virtual control, visual control and functional control. Visual control means that consumers can access and manipulate the products with their mice and keyboard such as zooming and moving. This kind of virtual control is widely adopted by many online malls and is applied to some virtual reality device, like a Google headset by which consumers can control and evaluate the products by turning their head. The second kind of controlling, functional control, which means consumers can not only assess the products by seeing, but also through the interaction with the virtual products to comprehend the function of products. This kind of control system is similar to devices like Valve and there are a few applications of this control system.

To evaluate the effect of two control systems, Jiang and Benbasat (2004) adopt perceived diagnosticity and flow. Perceived diagnosticity represents the extent to which consumers think the specific shopping experience is helpful when they assess the products. Authors describe flow as “an affective state when individuals are involved in certain activities” (p.117). The result of their research proves that these virtual control systems enable consumers to gain more information about products and they feel more confident when they choose products. The result of perceived diagnosticity and flow

about incorporation of both control system shows that it creates a more enjoyable shopping experience and it can help retailer to attract and retain consumers.

This marketing and promoting method has great potential in applications to the business fields. Vrechopoulos, Apostolou and Koutsiouris (2009) indicate that millions of consumers visit virtual worlds and spend virtual money, for both their virtual lives and real lives, despite the fact that these virtual worlds are based on games. However, the appearance of virtual reality devices will innovate business models and provide a new communicating and sales channel for retailers.

Relevant research concerning virtual reality and marketing or retailing is hard to find. Reasons may be that the application of this technology to business is still at an early stage, there are few applications for researchers to conduct research on and companies haven't fully understood its value and significance. Vrechopoulos, Apostolou and Koutsiouris (2009) say in their report that virtual customer's environment (VCE) enables firms to improve their business, but most firms seem not to fully understand and realize its significance and potential and "attach sufficient importance to the nature of customers' interaction in the VCE" (p. 470).

## **2.4 Human Computer Interaction**

We will interpret Human-Computer Interface in both website and virtual reality device. Then we will conclude the similarities and differences between them.

### **2.4.1 Introduction to Human Computer Interface**

In the 1950s, computers were hard to operate and less functional. Researchers felt tired and tedious after using computers and the results which were presented by computer sometimes were incorrect and far from satisfaction (Tan, 2017). Then researchers began to develop how to reduce the sense of fatigue when people operate the computer and tried to make it more useful to ordinary people. These concepts developed and became the foundation of Human Computer Interface (HCI).

Generally speaking, Human Computer Interaction means the way in which people interact with computers. It seems to be a discipline concerning computer science but HCI is more than that. It also consists of the knowledge of psychology, design, behavioral science and other scientific areas. Human Computer Interface focuses on the interface between users and computers. In one hand, researchers need to know what kind of interface which devices should adopt, on the other hand, they also need to observe how people interact and what their reactions are.

As mentioned, HCI is the agent between human and computers. Simply speaking, its working principal includes two parts, input and output. Input device receives the commands from humans and translate and transport these commands to the computer. Output device presents results to humans after processing the commands and information.

## **2.4.2 Development of HCI**

At the beginning, people operated and input the commands by hand which was boring and inefficient. Then Command-line interface (CLI) appeared. In this kind of interface, people input the command and information by using the keyboard in the form of command-lines typed to the program, by that the users could interact with the computer (Rouse, 2005).

In the next stage, programmers developed a new kind of human-computer interface called Graphical User Interface (GUI). In 1980s, companies created and applied GUI to computers such as Xerox Alto developed Xerox PARC in 1973 which was the first computer adopting GUI. Later, Apple Computer released Apple Lisa in 1983 and Apple Macintosh in 1984 which made this kind of interface wide-spread and popular. This kind of interface enables users to communicate with computers by using symbols, visual metaphors, and pointing devices (Levy, 2017).

On the basis of Graphical User Interface and the development of computer technology, the 2-dimension GUI become more and more advanced and the input medium also continuously changed. For example, the adoption of the touch screen replaced keyboards and mice.

Besides, many other kinds of HCI have been developed, even been applied to new devices. For instance, Apple Computer developed Speech interaction and recognition interface (Siri), a digital personal assistant which can recognize users' speech, which enable users to operate their device through their speech.

Nowadays, thanks to Game Industry and great progress in virtual reality technology, some computer firms put forward a new generation of virtual reality device with smaller size and lighter weight, which has brought human-computer interaction into a new and higher position. In the era of virtual reality, although most firms still adopt GUI, GUI has evolved from 2-Dimension to 3-Dimension or Heads-up display, a kind of display that do not require the user to refocus, which means the output of computers will be more realistic and closer to the real world. It also brings a revolution to the input process. In virtual reality, keyboards and mice are no longer necessary for HCI. For now, there are two kinds of input devices that are applied to virtual reality. One is using sight and

moving the head. The other is using different kinds of controllers and Motion Capture devices, which enable users to walk and interact as they do in the real world.

### **2.4.3 HCI in Virtual Reality**

Scholtz and his colleagues (1999) put forward that to enable users to enjoy the full benefits of advanced information and technology, a new generation of Human-Computer Interaction should be more useful, more usable and more universal. More useful means that people have access to getting the information they need without the limitation of form. Poor usability may lead to waste of time and high frustration. Universal interaction means the interaction should not only be available for professional people but also others. Carroll (2010) indicates in her article that environment factors can affect users' behavior and lead them to some expected and intended experience. Bashir et al (2014) point out that less number of option in menu and buttons can improve the usability and efficiency. In another aspect, contextual information should be accurate enough, otherwise it may lead to the loss of user's interest. Based on their findings, they concluded that effective HCI should enable users to focus on their task with minimum distraction.

### **2.4.4 HCI in business**

With the trend of digitalization, HCI also plays an important role in business and marketing. The different forms of HCI have different influence on company images and users' experience.

According to Lazaris and Vrechopoulos (2014), a GUI in an online store is similar to a one-to-one manner salesman in a physical store. This GUI can also provide a special or personal service when consumers browse an online store. However, the authors also mention and emphasize that this GUI needs to be designed properly so that it can add value.

## **2.5 IKEA**

In this thesis, we choose IKEA's application as a case to analyze VR as a marketing tools. First, IKEA uses their physical store as one of their main marketing tools where consumers can receive experiential marketing, which is described as a kind of marketing method which means consumers can interact with the product with their senses and the goal of experiential marketing is to have a holistic experience. Customers can experience and assess furniture in the scenes created by IKEA, then choose the products.

IKEA also publishes and releases a product catalog to display and introduce their products. Besides, IKEA adapts itself to the development of the Internet and widespread of smartphones. The company offers an online store and a smartphone application to sell and promote their products.

Due to the development of VR technology and newly released VR devices, IKEA also tries to adopt this new technique to be a new kind of marketing tools. As mentioned in previous paragraph, “IKEA VR experience” enables customers to move and see the kitchen wares and furniture in a virtual environment. We think this is quite similar to experiential marketing that IKEA is using in their current business, but it is not necessary for customers to go to IKEA’s physical store.

### **3 Method**

In this thesis, we choose IKEA's application to conduct a case study. The reasons for that are, first of all, both authors are living in Sweden and studying at University of Borås. Second, we search for an existing application on a computer platform and most applications are games and not suitable for our study. However, IKEA has released an application called "IKEA virtual reality experience" that fits our purpose. Although it is just a beta test application and its function is limited, it still can be used for our experiment and help us collect data.

#### **3.1 Research Approach**

The methods we will be using are experiments and short interviews with participants after the experiment. A questionnaire is an alternative option. However, after comparing the experiment and questionnaire, we believe experiment is a better method in our research. The reasons are as follow.

1. According to Bryman and Bell (2015), a quantitative method such as a questionnaire will be based on substantial amount of statistics which requires numerous participants. Considering the time and geographical limitation, it is impossible to get plenty of data.
2. We can observe the participants' actions during the experiment and more information and thoughts from customers can be discovered in the interview afterwards.

The sample we choose is a convenience sample, students or teachers from university of Borås despite nationality, gender or age. We think it would also be good to find participants in an IKEA retail store where we can find real customers but that was not possible. Since our first interview question is to make sure the participants are interested in cooking, so we think students and teachers in the university as our participants are also credible. The numbers of candidates are 10 to 15. It is a qualitative research so we do not need a large sample. The location of the experiment is Swedish Institute for Innovative Retailing Laboratory at University of Borås.

#### **3.2 Experiment Purpose**

In the experiment, we compare two ways of marketing, which are the traditional catalogs and virtual reality. We want to find out which approach attracts people's attention more and how participants feel about both marketing tools after the experiment.

### **3.3 Research Design**

This part introduces experiment design and interview design. We will present the procedures in experiment and questions we want to ask in interview.

#### **3.3.1 Experiment design**

We have conducted our experiment in three parts.

Part1: Participants look at products through IKEA kitchen online catalog.

Part2: Same participants use IKEA virtual reality experience application to experience products.

Part3: A short interview comes after with several questions prepared.

Part2 is conducted after Part 1. In order to control the irrelevant variables, the participants are the same and we use the same catalogs, websites and IKEA virtual reality application for every participant. We compare and record each participant's reactions and results during the two parts of the experiment, including his or her emotions. In part1 and part2, researchers do not engage in the experiment.

During the experiment, we will observe and record participants' words and reactions. The observation is non-participation observation because we want to diminish the influence from other factors. The observation mainly includes participants' attitude, words, movements and emotions during the experiment progress. We stand next to the participants and record information.

After the experiment, we conduct short structured interviews with six questions. The purpose of the interview is to let participants compare the two kinds of experience and comment on virtual reality technology. We are able to know if their buying interests have been stimulated during the interview. Since the results are not trustworthy if we merely compare the time participants spent on each part, an interview increases the credibility of our research.

Independent variables represent the theoretical explanations of the outcomes. It is the reason for result. Dependent variables represent the results which are influenced by independent variables and other factors. Controlled variables are used to capture factors which are extraneous to purposes of research (Mattingly E.S., 2015). In our experiment, we choose independent variables, dependent variables and controlled variables as follow:

Independent variables: IKEA online catalogs and IKEA virtual reality application. We would like to compare the two ways of marketing so the participants will first use online catalogs and then change to virtual reality application.

Dependent variables: Time that is spent on the two marketing tools. By changing the

marketing tools, participants will spend different time on the tools which can be recorded. The participants' opinions about the experiences are also the dependent variable.

Controlled variables: The catalog and the VR application are the same for every participant.

The experiment is conducted in the retail lab. External environment factors have no influence on the experiment results.

### **3.3.2 Interview Design**

We have conducted a structured interview. At first, we asked our participants the frequency of using kitchen to make sure that participants are familiar with kitchen items and interested in cooking which made our result more reasonable. We also asked whether they have ever heard and tried VR before to find out the main reason why they tried it or not. Then, we asked them what they have remembered in online catalog and VR. We want to see whether VR can be more impressive by measuring items and designs that they remembered in both online catalog and VR.

Our interview contains six questions

1. How often do you cook?
2. Have you heard about virtual reality before? If yes, what is it? If no, why not?
3. You have spent more time in the online catalog/virtual reality application, how does it attract you?
4. After reading the catalog, can you recall any design or item?
5. Are you interested in the items in VR? What items can you remember?
6. What expectation do you have about VR in the future?

### 3.3.3 Exhibition of device



HTC Vive (Keach, 2016)

HTC Vive device is used in our experiment. It consists of a headset and two controllers. Users can see virtual scenes in the headset and make moves by controllers in virtual environment.



IKEA VR Experience (Kohlstedt, n.d.)

Figure 2 display the environment in IKEA VR application and user interface. Users can look at details of kitchen items in this virtual environment.



### IKEA Kitchen Online Catalog (IKEA, 2017)

Figure 3 shows one page of 2017 IKEA online kitchen catalog. It has 55 pages in total and contains over 20 different sets of kitchens.

## 3.4 Data Collection

In the experiment, two researchers recorded participants’ reactions in virtual reality and online catalog. We wrote it down and combined the results together. After that, we have put our data into three tables. Table 1 is the time that participants spent on the catalog and the VR application. We calculate the percentage of the time difference. Table 2 is the interview results, which shows participants answers for six questions. Table 3 is about participants’ reaction during the progress.

## 3.5 Credibility

The credibility of the experiment result is based on participants’ experience and feelings. As a result, an interview after the experiment is not enough. To ensure the credibility, the record of how long time participants have spent in each approach is necessary. By combining the answers of interviews, reactions and time that they spent on the online catalog and the virtual reality tool, we try to make the result more credible.

We were standing next to the participants through the whole experiment progress which allows us to record every reaction of participants.

## 4 Results

Ten participants have conducted the experiment. The record of time spent on the two different marketing tools is presented in table 1. The answers from the interviews are presented in table 2. Table 3 records participants' reaction and their words in the experiment. Table 2 and table 3 are displayed in the Appendix.

Table 1: the time that different participants spent in online catalog and virtual reality

participants	time in online catalog	time in VR application	The time in VR compared to online catalog
1	11'38"	12'08"	+4%
2	7'00"	8'19"	+18%
3	8'23"	9'10"	+9%
4	1'45"	5'25"	+209%
5	2'14"	2,08"	-4%
6	3'30"	8'50"	+152%
7	1'30"	4'27"	+198%
8	2'25"	2'50"	+17%
9	2'53"	4'41"	+62%
10	5'21"	8'39"	+61%
Average	4'39"	6'37"	+42%

From table 1, we found most participants spent more time in using virtual reality devices, except that one participant spent more time in the online catalog. The average time in online catalog is 4'39" and in VR application is 6'37". Nine of tenth participants spent more time in virtual reality application than online catalogs. Only one participant spent more time in online catalog, but the time that participant spent in catalog was just 6 seconds longer than that in virtual reality. Overall, the time that users spent in virtual reality is 42% longer, compared to the result of time they spent in online catalog.

The table 2 in appendix showed participants' answers in the interview. In this table, we record the frequency of using kitchen, whether they had heard and experienced the virtual reality, what impressed them after experiencing virtual reality personally. According to their answer, most of our participants used kitchen frequently. Most of them had heard about it but never experienced it before. Only one participant said he have experienced it. Participants could remember and recall some items and designs in both online catalog and VR environment. We also asked participants to talk about what expectation they have to the development of VR after experiencing virtual reality and devices. Some of the participants hoped the graphic should be more clear and hope VR can add more voice and sound. In a word, virtual reality should be much closer to people's real life. Some participants also recommended that VR device should be much lighter, more user-friendly and that the cable should be removed, because they felt the headset was heavy, operation was not friendly enough and their actions were restricted

because of the cable. The table 3 in appendix displays participants' reactions in experiments. We recorded participants' reactions when they read online catalog and experience in virtual reality. When participants read the online catalog, they did not talk and express their emotions. There were few expressions on their face. When they experienced virtual reality, they felt confused at first. But when they were accustomed to the devices, they showed their happiness and expressed their emotion by using words like "wow" and "fascinating".

## **5 Analysis and Discussion**

### **5.1 Time Analysis**

According to the experiment results, we found nine out of ten participants spent more time in the virtual reality application than the online catalog. Only one participant spent more time in the online catalog, but the time that the participant spent in the catalog was just 6 seconds longer than that in virtual reality. It indicates that most people spent more time and enjoy more in virtual reality environment. In addition, contents and items in the virtual reality application are far less than in the online catalog but there is a trend that participants put more attention to virtual reality, which means the virtual reality environment might attract more attention from people. As we mentioned in the theoretical framework, the longer consumers spend on the websites, the more information they can receive to assess and evaluate the products or service, the more likely it is that they will consume (Baiké, n.d.). The time that users spent in virtual reality is 42% longer than that in online catalog on average. However, by comparing the time difference between catalog and VR application, we find that participant No.4 and participant No.7 spent 209% and 198% more time in virtual reality application respectively, which is much more than the rest of participants. To be fair, we removed the out layers and calculated the average for the other participants which shows the majority spent 30% time more in VR application. Since our estimated time for each participant is around 4-6 minutes which is very short, as a result, we think that 30% more time is not significant. In addition, other factors might cause participants to spend more time in virtual reality application. Firstly, it was the first time for most participants so they were having fun during the virtual reality experience, which led to a longer time in VR application. Secondly, most people might find it tricky to use since they are not familiar with the new technology. It took some time for users to get used to the VR application. Thirdly, participants might be familiar with reading online catalogs so their speed may be faster in online catalog. In conclusion, participants are likely to spend more time in VR environment but the extent is not significant.

### **5.2 Interview Analysis**

In the interview section, there are six questions. The first question is to ask participants' frequency in using the kitchen. We want to make sure that every participant is familiar with kitchen stuff in our experiment. The result is that every participant often cooks so it matches our requirement. Most of participants were students and a few were academics.

The second question is to know whether participants have heard about or used virtual reality technology before which can give us a general background of the current use of

in virtual reality. Most of participants said they heard about it but never used it before, except one participant. This participant told us he/she used to experience VR once by using Baofeng glass, a virtual reality glasses headset, released by a Chinese company whose major business is Internet and E-business. This glass requires users to insert their mobile phone into glasses headset and a specific entertainment application on smartphone. We have also asked the reasons why they had not tried VR. Their reply could be summarized into no opportunities and high costs. The result is, it seems that VR is hot and popular but for some reasons people don't have chances to try it. The reasons might be high cost or other factors which make VR unavailable. This is beyond our topic and more studies need to be done.

The third, fourth and fifth question are designed to find out what attracts participants in VR and catalogs respectively. On the basis of marketing theory, the purpose of marketing is to attract customers' attention, arise their interest and motivation to consume and leave impression in their mind (Tracy, 2014). Participants talked a lot about interesting functions and stuffs in virtual reality such as interaction and immersed environment. It is interesting to see that all participants can recall at least one product in the virtual reality while some participants cannot even remember a single item from the online catalog.

The sixth question is about the participants' expectation of virtual reality technology. Details in the VR environment and inconvenience of headset are two major problems. As for details, we believe VR device will be better in future. Since the experiment tool we use is IKEA kitchen test version, more functions and details might appear in a future version. As for the headset, it has heavy weight and a long wire to connect the computer. Participants are uncomfortable wearing headset for a longtime and while interacting, they sometimes stumble over the wire.

### **5.3 Participant's Reactions Analysis**

We recorded participants' actions while conducting the experiment. We found that 50% of participants did not finish reading catalog and stopped reading it halfway. Almost every participant speeded up after reading it for two or three minutes. The result shows that many participants can read the online catalog at the beginning, even read the detail information about products. However, when they read more about the online catalog, they will speed up and not read it as carefully as from the start. Online catalog, as a marketing tool, seems easy to get readers bored. The more consumers read, the less interest they have to check it carefully. However, while some participant using virtual reality, they used "Wow" "Fantastic" words to describe the feeling when they were experiencing virtual reality environment. Menon (2004) says the effective advertising should leave a memory in customers' mind. In our interview, we find all participants have memory about what they did and how they interacted in the virtual world. It seems that virtual reality leaves memory in participants' mind.

## 5.4 Human-Computer Interaction

This thesis is to find out whether virtual reality is a better marketing tool to attract their attention and raise motivation to consume compared to online catalog. In Human-computer Interaction, these two methods have similarities and differences. Both online catalog and virtual reality adopt GUI (Graphic User Interface) to interact with users. However, the online catalog uses keyboards, mice and touch screens as input device and the output is a 2-Dimensions graphic while virtual reality uses specific controllers and devices to capture users' actions and output is a 3-Dimensions graphic. According to the theory of Bashir et al (2014), 3-Dimensions can make consumers focus on products and evaluate products more comprehensively in a shorter time.

As mentioned before, compared to online catalog, participants showed their joy and excitement when they were experiencing virtual reality. We believe participants enjoy the process, which they could join in the interaction with companies. Combined with the theories we present in the theoretical part, Scholtz and his colleagues (1999) mentioned that a new generation of VR device should be more useful, more usable and more universal. We think VR seems to be a more user-friendly and effective human-computer interface compared to computers, because users do not need too many times to get accustomed and train how to operate these devices. According to Carroll (2010), companies can transmit their value of companies to consumers and lead them to the expected and intended experience with proper design. It seems that companies can use VR to create value with customers together and realize their purposes of marketing. For example, IKEA can transit its value to customers when they interact with the VR device, which can increase their interest and motivation to purchase.

In our record, we also could find that there are still some weaknesses in the VR device. For instance, there were several participants that complained about the heavy headset and they worried that the headset would fall from their head. The cable is also a problem. Participants' action and movement are restricted by the cable. Finally, some participants talked about the safety. Virtual reality can give users experience as if they are true, but they do not truly exist in the physical world. Users' eyes are covered by the headset. So they do not know what happens in the real world or whether there are obstacles in front of them. So they could get hurt. In the current device, there are a few systems to ensure the security of users. We believe this is an important aspect that needs to be improved.

## **6 Conclusion and Further Research**

After our analysis, we will conclude this thesis and raise the questions and difficulties for further research.

### **6.1 Conclusion**

The conclusions are from four aspects.

1. Participants were likely to spend more time in VR environment compared to online catalog. However, the time extent was not significant.
2. From the interview results, we found that participants remembered and recalled more items in the virtual reality environment.
3. Participants' interests seem to have been stimulated more in VR than from the online catalog. It seems that virtual reality can create positive memories and participants are more enjoyed in the VR environment.
4. Finally, in terms of Human-Computer Interaction, we find that participants can interact with items and environment easily and they enjoy the process of interaction. We think that HCI in VR is more useful, more usable and more universal compared to computers, but it still needs more improvement. It is effective and friendly for users to operate and help them focus on their target.

To answer the research question, it is reasonable to say that Virtual reality as a marketing tool is able to increase customers' interest more compared to the online catalog.

### **6.2 Further Research**

Virtual reality is a new area and little work has been done yet. In our work we have conducted an experiment but it also has limitation. Despite of IKEA, more cases can be looked into and different methods can be used in future research.

Besides that, in this research, most of participants are students. We think we shall add other factors into further research, such as age and the different degree of demands to cooking etc. In addition, HCI is also a factor which will affect the consumer experience when they are shopping. In further research, we will study how HCI influence users' experience in virtual reality.

According to our record of participants' reaction, most of them mentioned the reason why they did not try to use or experience VR is that they have not had any opportunity. VR is still at an early stage and not everyone has opportunity to use it. In our experiment,

it is the first time for most of participants to experience it by themselves. It is possible that they would like to spend more time in experiencing it instead of checking and evaluating the items. It will affect our result and conclusion.

## Appendix

Table 2: participants' answer

Participants question	1	2	3	4	5	6	7	8	9	10
1. How often do you cook?	often, five times per week	twice or three times per week	always cooking, everyday	3days per week	cook everyday	three hours per week in th weekend	2-3 times per week	every day	cook every day	everyday
2. Have you heard about virtual reality before? If yes, what is it? If no, why not?	heard about vr before, never experience before, reason: high cost, will buy if has enough money	heard vr but never experience, new technology and not widespread, do not have demands	heard but never experience, lack of opportunity	heard but never used, reason no opportunity and high cost	head but never experience before no opportunity	heard about, no experience, reason no opportunity and high cost	experience vr baofeng glass	never experience, no opportunity and no demard to buy	no experience, no opportunity has demand to buy	heard no experience, no opportunity high cost and little function
3. You have spent more time in the online catalog /virtual reality application, how does it attract you?	people can move and interact in vr, can do the thing that cannot do in real world	new technology, interact, but operation is not easy	fun and interact, catalog is dull	interact, catalog is boring to read	feel like in the real world and have sense of graphics	difficult to begin, fun to try, but learn more and easier to look in catalog	interact	new technology	interact	interact and quite realistic
4. After reading the catalog, can you recall any design or item?	remember the item in online catalog, it is clear and can read the detail how to use , more detail. the basket in the water	in catalog, bowl	a small item in catalog	nothing remembered in catalog	nothing remembered and interested in catalog	give more things that not used to	nothing remembered	the black kitchen	in catalog, knife and electronic oven	catalog, tap and lampblack
5. Are you interested in the items in VR? What items can you remember?	the black kitchen	in vr no item interested	the desk	remembered but did not want to buy	meat balls and desk and drawer	fan, drawer, basin	no interested in purchasing and remember meat ball basin and cock	in vr oven and electronic oven	many things in vr (detail)	vr oven and e-oven
6. What expectation do you have about VR in the future?	more detail, the cable's restrict and heavy headset	more detail, sound and voice	heavy headset and cable and more detail	better graphics and more detail	more realistic and details	security problem and click convenient	clearer graphics and hard to operate	more easier to use	more easier to operate and more function	became an online shopping store

Table 3: records of participants' reaction

participants reaction	1	2	3	4	5	6	7	8	9	10
online catalog	browse, check the detail at begin, then speed up and finish all catalog	calm at first, get bored gradually, do not finish the catalog, "cannot find some product in detail"	check detail at beginning , after five minutes speed up and do not check the detail menu	only carefully watch several pages, then skip to the final,	only browse quickly, do not finish the catalog	look carefully and check the detail menu	only browse the beginning and do not finish the catalog	watch carefully and check the detail at beginning, the browse quickly and do not open menu	look carefully the whole catalog	browser quickly, finish the catalog
virtual reality	excited, throwing the item in the vr	smiling and excited,	happy, careful	careful, surprising and happy, stamp on the cable	calm, curious and smiling, confused in operation	astonishing, operate difficultly at beginning, accustomed quickly, careful	happy, "I do not want to take off the device", difficult operate	careful, surprising, happy, "operating is not easy"	happy	smiling, calm

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