E-Commerce Retail & Augmented Reality

An Exploratory Study about Virtual Fitting Room Technologies and Online Customer Experiences

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ABSTRACT

Purpose – The purpose of the present research is to develop a better understanding of the logic behind virtual fittings room (VFR) technologies and the opportunities they can create to enhance B2C e-commerce retail. It aims to establish understandings of how augmented reality (AR) technologies, such as VFRs, can enhance the customer experience in e-commerce retailing. More specifically, the research focuses on customer satisfaction and emotions after VFR experiences and discusses the technology's potential tangible and intangible benefits.

Method - Based on theoretical literature, a conceptual framework was developed and elaborated on the components of AR technologies, VFRs, the customer experience, customer satisfaction, and customer emotions. Drawing on a qualitative research approach, semi-structured interviews with twelve commonly known VFR users were conducted and discussed the customer satisfaction and emotions of VFR experiences. After collecting the data, the thematic analysis identified and analyzed various themes and patterns related to the research questions.

Findings - Results have indicated that the fast utilization of VFR technologies, its user-friendly character, the low expectations towards the novel VFR tool, and the increased shopping productivity contributed to the overall customer satisfaction. As a result, emotions such as joy, surprise, and curiosity occurred. Additionally, VFR's efficiency and beneficial impact on the environment are relevant customer motivators to use VFRs. Still, VFR novelty needs more innovation in order to reach customer trust and loyalty. Besides that, low customer efforts and low VFR awareness caused no customer knowledge, influence, or referrals. The customer behavior-intention gap thus remains a presence, despite the positive emotions after the VFR experience. Therefore, e-commerce retailers should focus on customer convenience via VFR technologies to enhance the customer experience. Finally, this study served an exploratory purpose, and its objective was to generate theory. In addition to that, antecedents of the VFR experience, like customer satisfaction and emotions, could further investigate the environmental's tangible and intangible consequences. Therefore, future research could follow the proposed conceptual model presented in the last part of this study.

KEYWORDS: *Virtual Fitting Room, Customer Experience, Customer Satisfaction, Customer emotions, E-Commerce Retail*

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List of Abbreviations

AR	*Augmented Reality*
B2C	*Businesses to Customers*
CE	*Customer Engagement*
VFR	*Virtual Fitting Room*
VR	*Virtual Reality*
WOM	*Word-of-Mouth*

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I. Preface

The basis for this thesis originally stemmed from my passion for new technologies such as virtual reality and augmented reality. Despite their novelty, I do believe that virtual fitting rooms could support customer experiences and indirectly offer solutions to current environmental issues in e-commerce retail. As we are moving towards a digital world in which new technologies are increasingly interwoven in our lives, it was my goal to develop an understanding of this.

I would like to thank my family and friends for their mental support. It has been an intense process in which their love and understanding has provided significant guidance throughout this research.

Although I have faced some challenges while writing this thesis, I feel proud of what I have accomplished. I would like to thank you for your time and interest and I sincerely hope this thesis will provide you with meaningful insights and serve as an inspiration.

Renée Koppens

1. Introduction

1.1 Introduction to the topic

In the digital age, society is experiencing many shifts in culture, political and economic structures. Phenomena such as globalization, the rapid development of technologies, and rising concerns towards the environment, change the way consumers behave in digital spaces. Other socio-economic characteristics like higher incomes and changing lifestyles induced the growth of e-commerce activities. The concept of e-commerce "includes activities that directly support commerce through electronic connections" (Tangpong et al., 2009, p. 132). In other words, the term covers the buying and selling of services, products, and information through the internet.

Besides a rise in parcel delivery, the emergence of e-commerce and the increased traffic in online spaces evolved into what is known as the *platform economy*. Whereas “e-commerce” merely denotes the buying and selling of goods via the internet, the digital platform economy moreover includes big tech companies who offer a wide range of online structures and changed the way people engage in digital environments (Dekker & Okano-Heijmans, 2020, p. 18). This reorganization of the economy enables human activity in online services, in which platform owners like Uber, Facebook, and Google are seemingly developing power (Kenney & Zysman, 2016, p. 62). They determine how we work, communicate and live, which in turn sets expectations for speed, productivity, and efficiency (Wajcman, 2018, p. 168).

As a result, businesses have had to adapt their corporate communication strategies to manage these cultural expectations of speed. An example of such adaptation in corporate strategies is integrating Augmented Realities (AR) in digital marketing communications. AR technologies enable online customers to visualize what they are purchasing via virtual interactions. It allows them to preview products or experience services within their own time and physical environment (Lu & Smith, 2008, p. 215). Previously, retailers have been using Virtual Reality (VR) to provide online customers with a new type of shopping experience (Lu & Smith, 2008, p. 216). This VR-based e-commerce system offered more product information than traditional website tools due to virtual product models displayed on computer screens. Unlike VR, which replaces the physical world with computer-generated 3D depictions, the development of AR enhanced physical reality by incorporating virtual displays into the real world.

A specific AR technology in e-commerce retail is virtual fitting room (VFR). Virtual fitting rooms are new unique e-commerce systems that allow consumers to try on goods like watches, glasses, or clothes via online AR features. A brand that offers virtual try-on methods is the optician retailer Ray-Ban. Similar to the hyper-realistic filters of Snapchat, customers are able to try on glasses virtually via Ray-Ban's mobile app. While using a mobile camera, customers can try on multiple virtual frames presented as interactive photo-realistic images on their faces (see Figure 1).

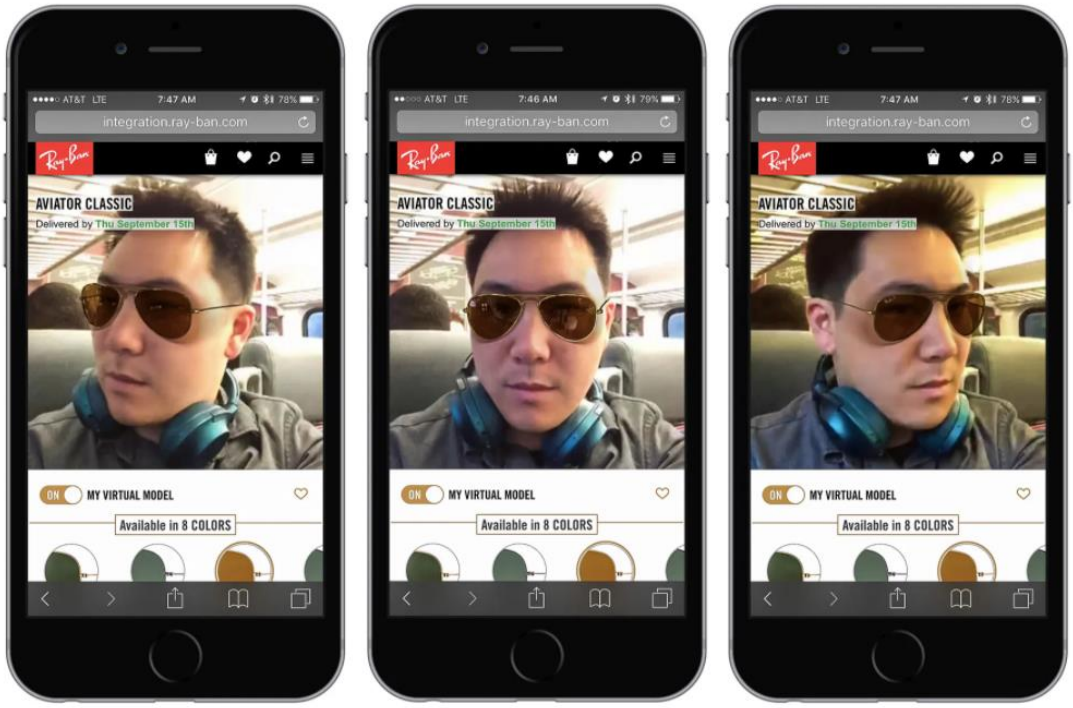

Figure 1.

App interface virtual try-on Ray-Ban

Another e-commerce retailer that utilizes VFR technologies is Formex. The brand provides Swiss-made watches via an application that allows customers to virtually try on watches (Formex Swiss Made Watches, 2018). Customers first need to print out a strap with specific markers and wrap this around their wrist. Subsequently, within the Formex TryOn app, they can choose a watch they prefer to try on.

Figure 2.

Formex TryOn application

1.2 Scientific relevance

VFRs are promising and unique technologies that have the full potential to become the next big thing in e-commerce retail. Despite their unique character, VFRs are novel technologies that could have beneficial outcomes for online retailers. Existing literature mainly focuses on the economic profits and environmental benefits for *e-commerce retailers* in which technological development has been examined (Nordin & Selke, 2020). However, the social aspect seems to be often overlooked in academic research. This seems odd since business innovations both rely on social considerations and technological development. Besides that, little research has been done on specific technological developments in e-commerce retailing, like VFRs. There has been a gap in the literature regarding the application of VFR technologies in e-commerce retailing and its tangible and intangible consequences for *online customers*. Thus, this study offers one of the first steps in gaining insights into customer perspectives on VFR technologies.

1.3 Societal relevance

Besides the academic relevance of VFR experiences in e-commerce retailing, there is also a societal significance regarding customer behavior and attitudes within VFR experiences. Customer purchase decisions have a dominant position within the retailer communication strategies and finally determine a firm's success (Souiden et al., 2019). To navigate and optimize these customer behavioral responses and experiences, e-commerce retailers could implement VFR technologies in their online environment. Therefore, researching customer satisfaction and emotions after VFR experiences in e-commerce retailing helps to better understand the logic behind VFR technologies and the opportunities they can create to enhance B2C e-commerce retail.

1.4 Research questions

Considering all the above, this research highlights customer perspectives on VFR technologies and discusses the potential tangible and intangible benefits after VFR experiences. This leads to the following research question: *How can AR technologies, such as virtual fitting rooms, enhance the customer experience in e-commerce retailing?* Subsequently, two sub-questions arise:

1. *How satisfied are online customers after using virtual fitting room technologies?*
2. *What emotions do online customers experience after using virtual fitting room technologies?*

The former sub-question digs into customer satisfaction outcomes, while the latter explores the emotional effects of VFR experiences.

1.5 Chapter outline

Based on theoretical literature, a conceptual framework will outline different interpretations concerning AR attributes, VFR technologies, and the construction of the customer experience by

means of customer engagement, customer satisfaction, and customer emotions. These components will elaborate on the antecedents of customer satisfaction and emotions after VFR experiences. Drawing on a method of in-depth interviewing, a qualitative research approach will analyze different meanings and assumptions of VFR customer experiences. Following the conceptual framework of AR attributes, VFR technologies, customer satisfaction, and customer emotions, a thematic analysis gathers interview data and will draw connections to VFR technologies in a social/behavioral context. Broader theoretical discussions will eventually elaborate on the environmental impact of VFRs. Finally, the conclusion will clarify how AR technologies, such as virtual fitting rooms, enhance the customer experience in e-commerce retailing. Subsequently, limitations and suggestions for future research are presented. The extensions of the proposed conceptual model could be used as guidance for future research in VFR technologies and e-commerce retail business communication strategies.

2. Virtual fitting rooms in a social context

In this section, academic research is discussed while different theories are examined and interwoven within conceptual frameworks. The first paragraph focuses on the conceptual framework of Augmented Reality (AR), in which sub-components of AR attributes are explained. Paragraph 2.2 dives into a specific AR technology: Virtual Fitting Rooms (VFRs). It provides an overview of the disadvantages and advantages of VFRs for B2C e-commerce retailing. In the final paragraph, a conceptual framework of the customer experience is outlined and determined by means of the customer engagement, customer satisfaction, and customer emotions constructs.

2.1 Augmented reality

The ability to imagine and generate mental images that reflect on products and experiences of brands is a crucial skill during the customer decision-making process (Heller et al., 2019, p. 97). Mental imagery is "a process by which visual information is represented in the working memory" (MacInnis & Price, 1987, p. 473). It enhances information through mentally generated images of products or environments and builds on potential customers' experiences. An example of such mental imagery used in some marketing communication strategies is *Augmented Reality* (AR). AR technologies are real-time direct or indirect views "of a physical, real-world environment that has been enhanced/*augmented* by adding virtual computer-generated information" (Furht, 2011, p. 3).

AR has three key characteristics that label virtual and real worlds (novel experience), interactivity in real-time (interactive experience) while being presented in 3D (vivid visual experience). *AR interactivity* is defined as the ability to control what an AR user sees through the real world and virtual worlds (McLean & Wilson, 2019, p. 212). While analyzing the effectiveness of AR technologies, interactivity can be approached through two perspectives: a technological outcome and the user perspective. The technological outcome focuses on the technological interactivity features such as speed, mapping, and range. *Speed* refers to how quickly users can manipulate content, while *mapping* embodies the similarity of control in the virtual world to the real world (McLean & Wilson, 2019). Mapping signifies the ability to control human actions within mediated environments. The last sub-component of the technological outcome to increase interactivity is the *range* or the extent to which its users can navigate content. In other words, it implies the number of possibilities and variations that can be manipulated within each attribute (Steuer, 1992). On the other hand, the user perception approach argues that interactivity cannot be experienced without users' subjective perceptions. The subcomponents of the technological outcome and the user perspective indicate the control of the AR interactivity attribute.

Another unique attribute of AR is *vividness* – the detailed presentation of a 3D image. According to Steuer (1992), vividness is "the ability of a technology to produce a sensorially rich mediated environment" (McLean & Wilson, 2019, p. 212). Following the technological perspectives

of AR vividness, the sub-components depth and breadth embody the effectiveness of the AR vividness attribute. *Depth* refers to the quality of the depicted information perceived by the users, whereas *breadth* measures the number of sensory dimensions a communication medium can provide (Yim et al., 2017, p. 91). From a user perspective, AR vividness supports customer's mental imagery anticipatory experiences and enhances the customers' memory of relevant information. Furthermore, the AR vividness attribute contributes to the customer trust, in which customers are willing to utilize AR technologies and feel confident that the technological system will enhance their performance (Yim et al., 2017). These user and technology indicators describe the effectiveness of the AR vividness attribute.

The last attribute of AR technologies is *novelty*, which refers to unique, new, personalized content and stimuli experienced through AR displays. It corresponds between past media experiences and current thoughts and highly relates to individuals' familiarity with new innovative media technologies such as AR (Yim et al., 2017, p. 93). The combination of novel and unusual stimuli leads to customer enjoyment and curiosity, in which customers might share and influence other peers (McLean & Wilson, 2019, p. 214). In summary, generating AR technologies enables customers to create unique and detailed images of a combined virtual and real world.

2.2 Virtual fitting room

E-commerce offers many advantages for online customers, such as a wide range of products and purchase convenience. However, online shopping includes some disadvantages as well. Drawbacks such as privacy concerns, relatively high delivery costs, and the inability to see and touch the product make online shopping less attractive (Moroz, 2019, p. 240). Especially the high return rates negatively impact financial, social, and organizational aspects in society. The long-term return rate for clothing purchased in the UK is, for instance, 23%, whereas in the US around 40% and in Germany 70% (Cullinane et al., 2019, p. 9). At this point, the questions arise why brands still allow customers huge numbers of returns? First of all, legal provisions protect customers and guarantee customer returns. Secondly, competitive reasons make it impossible for stores to ignore return policies (Moroz, 2019, p. 242). These hassle-free returns create customer trust, increased customer loyalty, and contribute to overall customer satisfaction and emotions.

Nevertheless, product visualizations of images on customers' physical features could solve these prior complications of e-commerce practices and enrich customers' online shopping experience. A specific AR technology in e-commerce retail that could enrich and enhance customers' online shopping experiences is *Virtual Fitting Room* (VFR) (Yim et al., 2017, p. 90). According to Moroz (2019), a VFR is a "specially designed IT application that allows for the superimposition of the modeled clothing on the customer's figure" (p. 242). VFR is conducted through AR technologies that create accurate 3D avatar-type models of the customer's body. The technology enables realistic

shopping experiences for retail customers without being physically present in a shop. Furthermore, the ability to communicate via social media to obtain advice and feedback makes the online shopping experience even more realistic (Pachoulakis, 2012, p. 41).

Following the first two AR attributes, the interactivity and vividness of AR technologies like VFR allow customers to pro-actively gather information of products through realistic displayed virtual examinations (Yim et al., 2017, p. 91). The 'close-to-direct' product experience via 3D visualization improves the customer search experiences and thus enhances the customer knowledge. Users who experience the interactive functions through the range of VFR tend to feel a greater sense of enjoyment (Yim et al., 2017, p. 92). Moreover, the vivid product visualizations of VFR, in which users can try a variety of garments on a 3D avatar, stimulate customer's imaginative construction processes. For instance, Yim et al. (2017) found that those interactive technologies that present vivid product visualizations are linked to a more positive affective, emotional customer experience (p. 92). While focusing on the novelty experience, VFR is a relatively new technological development within e-commerce that online retailers on a larger scale do not use. The new, unique and different character of VFR elaborates on the novelty attribute of the technology.

To sum up, VFR could offer customers a 'certainty' that is currently neglected within B2C e-commerce activities, as revealed in many return scales reports (Moroz, 2019, p. 242). Offering 'the perfect fit' to customers is a crucial concern within the retail industry, whereas VFR could provide great opportunities and advantages to encounter these requirements (Pachoulakis, 2012, p. 44). Therefore, VFRs' new, unique and different characters, together with their interactive functions and vivid product portrayal, can enhance the customer experience.

2.3 Customer experience defined

Understanding the customer experience and journey has become crucial for firms (Souiden et al., 2019). Verhoef et al. (2009, p. 32) define the customer experience as a multidimensional construct that involves the customer's cognitive, affective, emotional, social, and physical responses to the retailer. It includes customer interactions with a firm's offerings during the customer's entire purchase journey. According to a recent study, executives' improvement of customer experience has been the number one top priority (Lemon & Verhoef, 2016, p. 69). Currently, even businesses like Google and Amazon hire chief customer experience officers or customer experience managers who are responsible for creating and managing customer experiences. The increased focus on customer experiences results from the accelerated development of many channels, media, and customer touchpoints within the customer journey map. This multidimensional construct of the customer purchase journey makes it harder for firms to determine customer's decisions. Therefore, it is essential to manage the customer experience and analyze different touchpoints in the customer journey map.

2.3.1 Customer engagement

First, a notion of the customer's role in the experience must be identified to manage already existing customers and new customers to a service brand (Bowden, 2009, p. 65). Managing experience-based relationships through engagement models that emotionally connect customers in profitable and sustainable manners contributes to the *customer engagement* (CE) (Pansari & Kumar, 2017, p. 308). CE considers a customer's attitude towards a brand and attempts to go beyond purchases. When the relationship between customers and firms is emotionally established, a level of engagement is reached. The term *engagement* is here approached as a psychological process that models the underlying mechanisms for customer loyalty. It is part of relationship marketing and includes emotional, cognitive, social, and behavioral elements that create opportunities for interaction between potential and current customers (Vivek et al., 2012, p. 127). The experience-based relationships along with intense participation with brands contribute to the overall satisfaction of customers.

2.3.2 Customer satisfaction

One key element of understanding these experience-based relationships is to analyze customer satisfaction. Hansemark & Albinsson (2014) conceptualize customer satisfaction as the customer fulfillment response towards e-commerce retailers. It assesses and evaluates customer attitudes and perceptions about an experience (Lemon & Verhoef, 2016, p. 71). The customer satisfaction can be analyzed through customer expectations, perceived value, perceived quality, and customer loyalty (Nisar & Prabhakar, 2017, p. 138). The first foundation of customer satisfaction is the *expectation* of a customer. Past shopping experiences, peers' suggestions, and information offered by competitors form customer expectations. When these expectations are low while the e-commerce experience is increased, customer satisfaction is reached.

Furthermore, customer expectations also determine the 'enjoyment' which is an antecedent of positive attitudes toward online shopping experiences (Nisar & Prabhakar, 2017, p. 139). The second construct of customer satisfaction is the *perceived value*. It indicates whether customers believe price offers are reasonable. Moreover, research has shown that "customer satisfaction is directly affected by the price perceptions, whereas it is an indirect outcome of the perception of price fairness" (Nisar & Prabhakar, 2017, p. 138). Purchase behavior is therefore depending on customers' online purchase intentions. The third foundation of customer satisfaction is the *perceived quality*. This is perceived as a post-consumption experience since customers compare expected quality with perceived quality. The last attribute of customer satisfaction is *customer loyalty*. It is understood as a favorable attitude in e-commerce retailing that leads to the repetition of purchasing. In other words, repeated online purchases indicate a loyalty to a specific e-commerce retailer.

2.3.3 Customer emotion

As part of the customer experience, customer emotions heavily influence customer loyalty and customer satisfaction. They are conceptualized as the main drivers of customer satisfaction and loyalty, suggesting that customers incorporate short-lived emotions into their evaluation and decision processes (Ou and Verhoef, 2017, p. 107). According to Bagozzi et al. (1999), emotions imply the "mental states of readiness that arise from cognitive appraisals of events or one's own thoughts" (p. 184). In consumer behavior literature, customer emotion is distinguished into incidental and integral emotions. Incidental emotions are mood statuses that are hardly in control of a firm (Ou and Verhoef, 2017, p. 107).

On the other hand, integral emotions refer to decision objectives such as consumption emotion and advertising-evoked emotion. Various touchpoints in the customer journey, like the pre-purchase, purchase, and post-purchase stage, may evoke different integral emotion processes. The *pre-purchase* stage encompasses all aspects of the customer's interaction with a brand from the beginning of the customer's experience (Lemon & Verhoef, 2016, p. 76). Behavioral elements like need recognition to considerations of satisfying that need are all involved in this first stage. The second *purchase* phase includes all the customer interactions with a firm and its environment during the purchase itself. It is signified by behaviors such as choice, ordering, and payment (Lemon & Verhoef, 2016). The final *post-purchase* stage encompasses the customer's experience after the purchase. It includes behaviors like usage, consumption, post-purchase engagement, and services requests.

Following the Theory of Reasoned Action and the hierarchy of effects models of customer behavior, customers' emotions are a precursor to action (Pansari & Kumar, 2017, p. 304). In other words, customers are willing to proactively interact with a firm they feel emotionally connected with. They could generate customer influence, customer knowledge, and customer referrals. The *customer influence* involves customer-to-customer social media influencing in which customers can affect others' activities within their social network (Pansari & Kumar, 2017, p. 302). Secondly, *customer knowledge* helps firms to understand customers' preferences. Leaving feedback or suggestions add value to the performance of companies and creates insights into the customer experience. The last consequence of emotionally connected customers is *customer referral* which often occurs through word-of-mouth (WOM). Thus, emotionally connected customers are willing to proactively contribute to intangible firm performance outcomes via customer feedback, social media influence, and WOM customer referrals.

2.4 Conclusion

In summary, the increased online engagement and participation of customers in society forced companies to reconsider their business models to meet new digital expectations.

Technological developments have offered customers tools to engage with brands through mobile applications and social media platforms (McLean & Wilson, 2019, p. 211). However, the development of these multiple channels, media, and customer touchpoints made it complicated for companies to optimize service experiences (Lemon and Verhoef, 2016). The increased customer-to-customer interaction through various social media platforms made it, for example, harder for retailers to examine customer journeys. Moreover, little research has been done on the antecedents and consequences of customer emotions in e-commerce retailing (Souiden et al., 2019, p. 287). Firms are aware that emotions drive customer behavior but do not know how to connect in ways that motivate desired customer behaviors (Magids et al., 2015, p. 5). Firms must connect with these customer emotional motivators in order to shift them into profitable behaviors. Consequently, emotional connections can provoke competitive advantages such as customer loyalty and growth.

To establish customer satisfaction and create emotional connections, companies could implement AR technologies, such as VFRs, within their marketing communication strategies. Via interactive functions and vivid product portrayals, new unique, and different customer experiences can trigger certain customer emotions and create customer satisfaction. This thesis aims to establish an understanding of VFRs and how they could enhance the customer experience in e-commerce retailing. Next, the methodology used in this study is presented and elaborates on practical approaches.

3. Methodology

This study investigates the logic behind VFRs in e-commerce retailing and highlights the customer aspects. It offers an in-depth view on the customer experience of VFR technologies. Qualitative interviews with commonly known e-commerce retail customers discussed the customer satisfaction and emotions of VFR experiences. After interviews were conducted, they were transcribed and coded using both deductive and inductive approaches. A thematic analysis was done to identify a variety of themes within the gathered interview data. Additionally, co-occurrence tables were developed to get an insight into the relationships among different themes.

3.1 Choice of method

This study has a cross-sectional and qualitative research approach since data is measured at one point in time. Its purpose is exploratory, and its objective is to generate theory. Semi-structured interviews were conducted to get more in-depth answers on the "how"-aspect of the research questions which were mentioned before. It seeks to understand individual customers' multitude of meanings and motivations and allows free interpretation without using any imposed questionnaire (Brennen, 2017, p. 22). Due to the flexibility of a semi-structured interview, the questions and structure of the interview could be altered, and additional questions, formulated based on previous responses and critical thinking, could be added (Bryman & Bell, 2015).

To understand the concepts of customer satisfaction, customer emotions, and VFR technologies based on participants' experience, language attempts to create a sense of the larger realm of relationships (Brennen, 2017, p. 4). These meaning-making processes are collected through qualitative interview data that draw on explanations and accounts of customer experience, satisfaction, and emotion. However, it is important to critically reflect on the role of the researcher during the reflexivity process (Brennen, 2017). This helped contextualize information interpretations while considering influences such as personal experiences, gender, ethnicity, historical context, etc.

3.2 Sampling

The qualitative interview method included sampling criteria that narrowed the study population down to a specific group of people. Interviews with twelve participants were collected and followed a list of criteria to be relevant for this research. Sampling criteria suggested individuals who are generally experienced internet users, so generation Y users were deemed ideal. Furthermore, the sample consisted of VFR experienced customers who were able to answer in-depth questions about the technological attributes of VFR technologies. A purposive sampling strategy suggested critical and maximal variation samples that include respondents who have experience within the research field (Flick, 2007, 27). Following leads in my network, interviewees were sampled through a snowball approach in which initial participants recommended other potential participants who met

the sample criteria. Some participants were regular online customers but had no specific experience with VFRs. Those participants were asked to use virtual try-on methods while shopping in online environments. Afterward, they were interviewed about their VFR experience. Before interviews were conducted, participants were asked to sign the informed consent form (see Appendix A). Participants used virtual fitting rooms of brands like L'Oréal Paris, MAC Cosmetics, Maybelline, Sephora, Chanel, Ace & Tate, Ray-Ban, Ikea, Charlie Temple, and Polette.

3.3 Operationalization

Interview questions and key concepts were derived from theoretical frameworks and discussed in the literature review. Together they contributed to formulating and answering the research questions. This study investigated the relationship between concepts of VFR technologies, customer experience, customer satisfaction, and customer emotions in e-commerce retail. Drawing on the theoretical frameworks in the literature review, the interview guide was divided into several topics that each explored these four concepts. A blank interview guide has been included in Appendix B.

The interview guide started with some preliminary questions to obtain some general information about the participant. Following up, the first section of the interview discussed the three components of VFR: interactivity, vividness, and novelty. To evaluate these components, technological outcomes and user perspectives analyzed each VFR component. Participants described technological outcomes of the VFR interactivity like the perceived speed, similarity of control, and the number of possibilities in the mediated environment. After that, interviewees were asked to examine the quality and sensory dimensions that investigated the perceived VFR vividness. Besides that, user perspectives asked the participants about their memory and whether they found their VFR experience trustworthy. Within the VFR novelty section, the VFR experience was compared with past media experiences and analyzed perceived unique, new, or different characters of VFR technologies.

Subsequently, a set of four topic scales were stated and evaluated the customer experience of VFRs. By addressing questions concerning the participants' perceived ease of use, perceived usefulness, enjoyment, and their subjective norms, a meaning-making process around the overall customer experience was developed.

Follow-up questions further elaborated on emotions and satisfaction with the interviewees' VFR experience. This research study focused on integral emotions in the post-purchase phase since the aim is to examine how VFRs enhance the customer experience in e-commerce retailing. Analyzing emotional decision-making processes after the customer experience contributes to that. The analysis emphasized the post-purchase phase to investigate what emotions online customers experience after using virtual fitting room technologies. Identifying specific trigger points and

emotions in the post-purchase stage led to clarifications for levels of customer engagement, customer loyalty, and customer satisfaction.

For the final two parts of the interview, the participants were asked whether they would like to share any other remarks they thought could be valuable for this study. In addition to that, participants were asked to share their opinion of the interview and whether they had any feedback. In this way, respondents were able to reflect on the interview while an indication was given on whether interviewees felt comfortable enough to share valuable insights and understood the asked questions. The feedback received was positive and elaborated on the curiosity towards the results of this study.

3.4 Data collection

The interview process was semi-structured through a topic guide and included a few sample questions. Semi-structured questions allowed the researcher to come up with new questions and have a natural conversation. The focus was laid on several topics that previous research has identified concerning the research questions. All interviewees were invited to participate in the research, after which the interviewees were able to choose the date and time which fit them best. Qualitative interviews were conducted through online video chat, reordered, and transcribed for further analysis. The interview encompassed a sequence of questions and started with an icebreaker. Interviews took up at least 45 minutes per respondent and were conducted in English.

To validate the interview data, regular member checks were done throughout each interview. After each main section of the interview, the main points of the respondents were summarized by the interviewer. Afterward, the respondents were asked to either affirm or deny that the summary reflected on the interviewee's views, feelings, and experiences. As a result, the information could be validated some more, improving the interpretation of the data when coding.

3.5 Methods of analysis

After all interviews had been conducted, they were transcribed and coded by the researcher to build familiarity with the data. The software used was ATLAS.ti version 9. A thematic analysis was executed to discover and visualize patterns, relationships, and recurring themes within the gathered interview data. The analysis followed a partly deductive approach, in which a pre-set codebook was developed, including categories and concepts based on the literature review. Secondly, an inductive approach allowed open coding to generate potential categories. All quotations got coded and categorized in themes like VFR attributes, customer experience, satisfaction with the experience, and emotions with the experience.

Eventually, all codes were given descriptions and colored red, green, or grey based on positive, negative, or neutral sentiments. Comparing sentiments across the interview data can be very valuable for later analysis. The affiliated quotes from the interviews were included in the codebook

and served as evidence for the findings of this qualitative research. After coding, the codes were sorted into different categories and themes to review the identified patterns' validity continuously. After the coding process, appendix C represents the final codebook of this research. Eventually, co-occurrence tables were developed to get an insight into the relationships among different themes and categories. After compressing empty cells, the values indicate the number of co-occurrences between concepts.

4. Results

This chapter outlines the interview results and is structured considering the thematic analysis conducted in this study. Additionally, the presented results are interpreted in relation to the research questions and theory discussed in chapter 2. The thematic analysis resulted in four main themes: VFR attributes, customer experience, customer satisfaction, and customer emotions. Section 4.1 elaborates on the technical and subjective outcomes of the VFR attributes. It evaluates individuals' perspectives on interactive features, the vivid product portrayal, and the novel character of VFR technologies. Part 4.2 discusses the VFR experience of interview participants. It describes the perceived ease of use, usefulness, enjoyment, and subjective norms which comprise the overall VFR experience. Co-occurrence table 1 represents alignments between VFR attributes and the customer experience. In paragraph 4.3, findings concerning customer satisfaction are gathered and analyzed by means of the customer expectations, perceived value, perceived quality, and customer loyalty. Table 2 reflected on relationships between the customer experience and satisfaction. The theme of customer emotion is analyzed in the final section and consequently discussed the customer influence, feedback and referrals after VFR experiences.

4.1 VFR attributes

4.1.1 VFR interactivity

First, the technical outcomes of the VFR interactivity examined the participants' views on their navigation through the VFR content in the mediated environment. The analysis revealed that most participants evaluated the speed of their control through the mediated environment as "fast." Interviewees often mentioned the code "easy" while describing the speed of live images. Descriptions emphasized how quickly and easily participants were able to manipulate the VFR content. However, the mapping of the VFR interactivity was perceived less in control. Participants believed that the similarity of control in the virtual world to the real world mainly was "unrealistic." Glitches concerning lighting, wrong positioning, lack of textures, and weird colorations emphasized this unrealistic mapping of the VFR interactivity. Some interviewees referred to bad Photoshop or Snapchat filters to exemplify their arguments: *"Sometimes Snapchat uses this very subtle filter, and I had the idea that this was often the case in the VFR environment as well."*

Furthermore, the number of possibilities and variants that could be manipulated within each VFR attribute seemed to be limited to a certain extent. Seven participants expressed that the range of the technology did not include all the products that they wanted to try on virtually. However, some participants experienced a broad range of product combinations: *"While I was trying out VFR make-up, I was able to combine different products and swap between those combinations."*

The individual's subjective perceptions of the interaction with the VFR content mainly contained adverse reactions. Positive responses mainly focused on the fast pace and ease of

navigation through the VFR technology. Negative descriptions of user control elaborated on the unrealistic mapping: *"It did the job, but it would have been nicer if the images moved more fluidly."* Moreover, some interviewees were concerned about their privacy. The subjective perspective on the interviewees' control revealed that some participants experienced privacy issues. One interviewee, for example, was shocked by how easy and fast the website had access to her camera. The fast accessibility to her data made her believe she was less in control of the technology.

4.1.2 VFR vividness

The second VFR attribute analyzed was the vividness, in other words, the effectiveness of the VFR content. Technological perspectives analyzed the quality and richness of the visual display in the mediated environment. Interviewees were asked to describe the detailed representations and formal features of the 3D images. Thematic analysis revealed that the high quality of the 3D image made the mediated environment vivid and *realistic*. However, some participants compared the quality of the depicted VFR environment with bad Photoshop or the Microsoft Paint software. According to one interviewee, textural elements within visual displays would enrich the sensory environment.

Furthermore, the sensory breath was minimal since participants were only exposed to visual sensory dimensions. Yet, one interviewee argued that other sensory additions would not make the experience more vivid: *"Maybe it is because you use products like make-up quite a lot. So, it does not add anything new to the experience because you already know what to expect."* However, she explains how VFRs could be helpful for novel products.

User perspectives towards the effectiveness of VFR technologies investigated whether the vividness of the product presentation could stimulate cognitive effects of information in the participants' minds. Most of the participants believed that virtual try-on methods would improve their customer memory *"because you tried it on yourself, which enabled you to memorize a little more product information."* However, three participants believed that similar displays made it harder to memorize relevant product information than regular online shopping experiences. The variations among different models presenting products make it easier to distinguish relevant information, explains a participant. *"I probably would not even have to favorite a product because I would remember the picture of 'the model with the red hair'."* The fact that the customers are 'their own model' and are exposed to similar visual displays of themselves thus made it harder to memorize relevant product information for some participants.

Additionally, VFR technologies are believed to offer more certainty to online shoppers. Interviewees think that the technology provides *"an extra dimension"* and argue that virtual try-on methods are perfect additions to other online shopping technologies. Although, seven participants expressed that they still prefer to go to the physical store since VFR technologies do not include any textural sensory dimensions. *"You really want to hold the product and feel it on your skin."* After the

VFR experience, most participants would still doubt whether their online purchase is according to their preferences. Subsequently, some argue that the technology needs to be improved in order to rely on it: *"There are still many things that could be improved in order to make it more reliable."* The fact that it is new makes it less trustworthy, as stated by some participants.

Privacy concerns form another recurring theme while analyzing the VFR experience. Five participants expressed feelings of discomfort towards their privacy while using the VFR. *"You give access to your camera, but you are not sure if the company is going to save the recording afterward."* Another participant argued that she did not like the feeling of not knowing what was going to happen with her data. Thus, the sensory-rich environment of VFR's seemed to trigger some privacy concerns within the customer trust segment.

4.1.3 VFR novelty

The last VFR attribute indicated the individuals' familiarity with the VFR technology compared to their past media experiences. The analysis found three recurring codes that describe the differential effect and novelty of VFRs. Most participants elaborated on the fact that the technology was very new and unique. *"It is unique because they do offer additional imagery compared to other technologies."* This quotation signifies the novel and additional character of VFR technologies. Besides that, five participants experienced a differential effect based on the personalization of content in the mediated environment. *"The fact that you can see yourself makes it more personal."* Another participant argued that VFR technologies embed 50% of online shopping and 50% of shopping offline. *"It comprises the convenience of shopping online and the benefits of shopping in stores into one technology."* This made the technology, according to her, very authentic and innovative.

To sum up, the analysis of VFR attributes revealed that the rapid and easy VFR interactivity made most participants believe they were in control. However, the unrealistic mapping and bad quality of the visual display in the mediated environment made VFRs less effective. The customer memory appears to be improved by most interviewees, whereas participants sometimes found it more challenging to memorize relevant product information due to the similarity of visual displays. The willingness to rely on and utilize VFR technologies is still doubtful because the technology is believed to be inferiorly advanced at this point. Nevertheless, VFR technologies are providing extra product insights, which are seemingly adding more certainty to online purchases. The differential effect of the technology is mainly based on its new and unique character, while personalization of content offers an addition to online shopping experiences.

4.2 Customer experience

4.2.1 Perceived ease of use

The first segment of the customer experience investigated the perceived ease of use during the VFR experience. “Easy” was the most recurring code here. Interviewees substantiated their argument by emphasizing the basic interface of the technology and the fast utilization (see Table 1). “*It was so easy to use, so after two minutes, I already knew my favorite lipstick color."* Other quotations such as “straightforward” and “flexible” were meant to describe the flexibility of the interaction with the technology. Some participants, on the other hand, believed that the use of VFR technologies was hard. Their experience was inefficient due to complicated features that loaded slowly and included multiple steps.

Another interesting recurring phenomenon was the perceived ease of use among different generations. Many interviewees highlighted the perceived flexibility and accessibility of the technology for older digital incompetent users: “*Everybody could use it, even my dad and grandmother.”* However, some participants doubt whether the technology is understandable for older generations. Younger people are used to digital applications, while novel technologies could complicate VFR use for the elderly.

4.2.2 Perceived usefulness

The second part of the customer experience analyzed the perceived usefulness of VFR technologies. Results about the shopping productivity, performance, and effectiveness determined whether VFRs enhanced or diminished the online shopping experience. Thematic analysis has shown that most codes contained positive sentiments towards the usefulness of VFR experiences. In other words, most participants believed that VFR technologies enhanced their online shopping experience. Many of them elaborated on the efficiency of the technology. The rapid shifts through different product try-ons enabled interviewees to accomplish their shopping tasks more quickly: *“I was able to try more things at a faster pace instead of having to grab wipes to clean my lips after trying a lipstick color.”* Furthermore, interviewees believed that the extra dimensions and insights offer more certainty to online purchases, which eventually causes fewer return packages: *“It enhances my shopping performance, and I can imagine that I would return less.”* This online shopping efficiency is therefore believed to enhance online shopping effectiveness.

However, some participants thought their VFR experience was time-consuming because *“you had to invest more time and effort in the technology.”* On the other hand, virtual try-on enabled customers to accomplish shopping tasks quicker during offline shopping experiences: “*I think it is definitely more efficient because you can just go to the store and instead of trying ten different product colors, you can just try the ones you liked best during your virtual try on.”* Moreover, recurring codes such as “filter away”, “cross off” and “pre-work” emphasized the increased overall shopping productivity since most participants still prefer to shop offline. In this way, virtual try-on seem to work as “cross-off lists” that enable customers to filter products. *“For me, it is more like, instead of choosing something I want to buy, it is kind of more knowing what I do not want to buy."*

VFR experiences enabled them to accomplish offline shopping activities more quickly because they could preview products via virtual try ons. Thus, most participants thought their VFR experience was useful due to the enhanced shopping effectivity and increased offline shopping productivity. Finally, four participants thought that VFR technologies could be beneficial in the near future. Recurring codes like 'still developing' and 'potential' explained how VFR technologies are believed to have much potential in e-commerce retail but still need more innovation.

4.2.3 Enjoyment

The third segment of the customer experience analyzed the enjoyment derived from the VFR experience. Thematic analysis showed that all participants expressed positive sentiments regarding their VFR experience. Participants described their experience as enjoyable while codes such as "fun", "helpful" and "pleasant" examined the experience. The highest recurring code was "fun", whereas participants argued that *"it was really helpful, especially during the lockdown when all stores were closed."* The technology appeared to be a pleasant online shopping assistant that made the experience helpful for interviewees. Only one participant expressed negative expressions regarding her VFR experience. She experienced frustrations during her VFR experience because she believed the virtual try-on was inconvenient.

4.2.4 Subjective norms

The fourth part of the customer experience analyzed the subjective norms towards VFR technologies. In other words, it investigated attitudinal and behavioral constructs that reflect on the perceived social pressure of VFR. The thematic analysis showed four interesting recurring themes. The highest recurring theme mentioned by interviewees emphasized the COVID-19 situation, in which participants describe how the lockdown provoked shifts in their online retail behavior. *"I feel like our society is pretty focused on consumerism, and I believe that this technology makes it even easier than it already is."* As a result, the participant expects that society will slowly move towards the VFR option. Moreover, the fact that customers are forced to shop online made the VFR tool more valuable: *"I think it is an additional technology that makes it easier to shop online. Especially during the Corona pandemic, whereas people are shopping more online than ever before."*

Another recurring theme embedded the beneficial outcomes towards the environment. One participant argued that VFRs are socially relevant due to their intangible sustainable outcome: *"People will order less unnecessary things so they will return fewer packages, while overproduction will be reduced."* Answers about the decreased return packages are indirectly linked to participants' concerns about the environment. Another interviewee expressed how VFRs can reduce the current inefficient system in which stock burns, overproduction, and return packages contribute to environmental issues.

Thirdly, many interview participants emphasized the unfamiliarity of the technology within their social environment: *"I never had a conversation with anyone about it, so I do not think it is that commonly known."* The code “not commonly known” appeared to be the second-highest recurring code in this category. Additionally, the unfamiliarity often co-occurred with quotations that emphasized the relevance of the technology (see Table 1). *"I was not familiar with it at all, but I think it could be the norm in the future. Also, due to its effectiveness and environmental benefits.”* Thus, the social pressure to buy online seemed to be increased due to the Corona situation, while VFR's enable interview participants to contribute to sustainable norms and values.

The final recurring code exemplifies the expected relevance and norm of VFR technologies in the future. Interview participants seemed to believe that the technology could be valuable in the near future but is still developing. Interviewees expected, for example, VFR to grow into the "new normal."

To summarize, the four segments of the customer experience theme analyzed the perceived ease of use, perceived usefulness, enjoyment, and subjective norms. Codes within these categories revealed that VFR technologies' fast utilization and flexibility make it an easy and accessible tool among different generations. Moreover, VFRs are perceived to be helpful due to the enhanced shopping effectiveness and increased overall shopping productivity. However, participants believed that VFR still needs improvement but has potential in the future. Its novelty seems to be the reason why the technology is not commonly known within the social environments of the interview participants. "Fun", "pleasant," and "helpful" described the enjoyment derived from the VFR experience. Furthermore, environmental concerns such as stock burns, overproduction, return packages, and unnecessary logistics made interviewees believe that the technology could be a very valuable tool to prevent these issues. Especially during the Corona lockdown in which participants were forced to shop online.

Table 1

Alignment VFR attributes and customer experience

Category	Code	Co-occurrences VFR Interactivity	Co-occurrences VFR Novelty	Co-occurrences VFR Vividness
Enjoyment	Annoying	1		
Enjoyment	Positive		1	
Perceived Ease of Use	Easy	5		
Perceived Ease of Use	Easy: Basic interface	1		

Perceived Usefulness	Faster	1		
Subjective Norms	Corona situation	1	1	1
Subjective Norms	Relevant in the future		1	

4.3 Customer satisfaction

The third theme of the analysis embedded the customer satisfaction, in which judgments concerning the VFR experience analyze levels of consumption-related fulfillment. In other words, the satisfaction with the experience determined whether participants would use the VFR technology again. The paragraphs below discussed interesting thoughts and insights regarding participants' satisfaction after using VFR technologies.

4.3.1 Low customer expectations

The thematic analysis revealed that participants had low expectations before utilizing VFR technologies. *"I did not really have high expectations. I thought it would be kind of funny and not serious."* While asking participants if their VFR experience worked out as well as they thought it would, most of them mentioned their low expectations: *"Even better, I think I did not really have high expectations. So, better than I expected."* This was related to the unfamiliarity of VFRs, in which participants examined that their peers or family members are not commonly known with the technology. "*I was talking with some friends about my VFR experience, but they had never heard of it before."*

Consequently, participants did not know what to expect and were therefore surprised by its convenient character: *"I was really surprised how easy, quick and user friendly it was."* "Surprised" was the second-highest recurring code in this category. Thus, the unfamiliarity with the technology in social environments and low customer expectations were surprising.

4.3.2 Added advantage

Another interesting outcome revealed that interview participants did not necessarily know that they needed the technology: *"It was not something that you needed, but the fact that it was there made you realize that it is needed and helpful."* In this way, the technology seems to be a beneficial "option" but not a necessity: *"It is more of an added advantage, rather than something that was really needed."* Furthermore, interviewees believed that VFR technologies allowed them to make their offline shopping activities more productive. *"Instead of choosing something I want to buy, VFR made me aware of the things I do not want to buy in-store."* The ability to preview products before

going to the physical store thus increased offline shopping productivity, which made the VFR experience helpful.

4.3.3 Convenience

Moreover, the VFR experience was believed to be useful due to its convenience and rapid utilization. As mentioned before, some participants believed the VFR experience was time-consuming, while the majority thought their experience was effective and convenient. *"I think the benefit would be that it is less time-consuming and that you do not need to go to the store."* Convenience is linked here to reduced time and effort when compared to traveling to the store. However, this seems contradictory to prior argumentations since most participants still prefer to shop offline.

Furthermore, participants reflected on the increased online shopping activities due to the extra dimensions offered by VFR technologies. However, VFRs seemed to spare time during offline shopping activities because of the invested effort online. Table 2 reflects on the alignment of customer experiences and satisfaction. The co-occurrences represent relationships between codes, which clarifies how the VFR experience is perceived as helpful due to its added value and user-friendly character.

Table 2

Alignment customer experience and customer satisfaction

Category	Code	Co-occurrences Satisfied	Co-occurrences Surprised
Perceived Ease of Use	Easy	1	
Perceived Ease of Use	Easy: fast		1
Perceived Usefulness	Pre-work	2	

4.3.4 Innovation

Lastly, some participants mentioned the technical development of VFRs. They believed that the technology is still in its early phase and needs improvement to be utilized more often in the future. The novelty of VFR technologies has been mentioned as a clarification for this: *"People always like to use new technologies. It will get more relevant once the technology is developed."*

Overall, the analysis has shown that participants felt satisfied with their VFR experience. Surprised feelings were strong precedents of positive attitudes triggered by low customer expectations. The preview option through virtual try ons made the technology helpful. Additionally, convenience and its added value made the VFR user-friendly and therefore enhanced the participants' satisfaction.

4.4 Customer emotions

The fourth construct of the thematic analysis focused on the emotions with the VFR experience. Interview participants were asked to describe their behavioral and emotional-related activities after using VFR technologies. The analysis represents mainly positive emotions towards the experience, in which "surprised", "curiosity", "fun," and "joy" are returning responses. One participant felt, for example, surprised by the ease of use but at the same time was unsure whether his online purchase was according to his preferences. He explained that the novelty of the technology made him feel unsure whether his product order was exactly what he had in mind. For some participants, the broad range of possibilities to virtually try things on created curiosity. Furthermore, VFR novelty caused joy and happiness after the VFR experience: *"I also felt joy because I thought it was funny to try things on and to do something new for once."* Some interviewees brought up the game element that provoked joy after utilizing VFR technologies. *"It is more like a fun game, and you can mess around with it."* Finally, these positive emotions are related to three codes of the customer enjoyment variable, namely fun, helpful, and pleasant.

Only two participants experienced negative emotions after their experiences. They felt insecure about their online purchase and expressed privacy concerns. As mentioned before, participants expressed feelings of discomfort: *"The fact that I did not really know how this technology worked and what the brand was going to do with my information made me creeped out a little bit."* The speed of the VFR interactivity thus allowed the technology to share personal information, which made participants feel vulnerable.

4.4.1 Customer influence, feedback, and referrals

All participants would recommend VFR to their peers. *"It is something novel, and I think that you want to tell others about something that is new and really cool."* Again, a distinction between older and younger generations was made since some participants would not recommend the tool to their (grand)parents.

However, it was remarkable that most interviewees did not share their experiences with others. Only two participants shared their VFR experience with friends. Nevertheless, all interviewees are willing to share their experiences because they believe their social environment is not familiar with VFR. Subsequently, participants thought VFR technologies could support e-commerce retail activities, which could be helpful for their social environment. Yet, not a single participant left feedback about their experience since it took too much time and effort. Reasons such as *"I never leave feedback"* or *"I only leave feedback about bad experiences"* reflect on these convenience influences. Some participants would only leave feedback via rating systems or small surveys.

Additionally, results mainly reflected on the perceived relevance of VFR technologies due to the tangible and intangible benefits. Interviewees emphasized its efficiency and referred to indirect contributions to the environment: *"I do think it is a great feature that helps you to buy the thing that you want, which eventually reduces return packages."* One interviewee believed that his VFR experience created more purchase certainty. He returned less, which eventually spared him time and effort. The current inefficient packaging logistics were believed to have a significant impact on the environment. Therefore, interviewees thought that VFR could offer a solution to those environmental issues: *"It helps to make purchase decisions when you have doubts, and it gives you a bit more security. You know a bit better what to expect while you hopefully will return less."* On the other hand, some participants believed the technology is not necessary because they would still shop offline and visit the physical store. Argumentations such as *"I could still live without it."* and *"It is not in my system yet, so I could still live without it."* exemplify the perceived irrelevance of VFR and refers to VFRs' novelty.

5. Discussion & Conclusion

5.1 Main findings

5.1.1 RQ1: How satisfied are online customers after using virtual fitting room technologies?

Findings from the present study have shown that VFR novelty and unfamiliarity with the technology in social environments created low customer expectations. Consequently, low customer expectations triggered surprised reactions, which contributed to the customer satisfaction. Furthermore, VFR novelty makes the technology not needed but rather an added advantage to e-commerce retail activities. The extra product insights and VFR assistance make VFRs useful shopping assistance tools. Nevertheless, virtual try-on enables online customers to filter products to a smaller scale which increases the shopping productivity in stores. This assurance of knowing what *not* to buy and preview products before purchasing them in stores enhances shopping effectiveness.

Subsequently, the fast utilization and flexibility of VFR technologies enable users to interact with virtual try-on easily. The technology appeared to be a helpful online shopping tool during the corona lockdown since physical shops were closed, and VFR provided more product information than traditional e-commerce tools. Moreover, the easy accessibility among different generations makes the technology user-friendly. Consequently, the rapid usage and high levels of convenience caused satisfaction among online customers.

Nevertheless, VFRs provoked low levels of customer loyalty since most participants still prefer to shop in physical stores. This can be clarified by the pre-purchase uncertainty that is a consequence of the unrealistic mapping and novelty of the technology. Customers are not relying on VFR technologies since it is believed to be novel and not fully developed yet. VFR technologies thus need more innovation in order to improve the customer experiences further.

Therefore, the fast utilization of VFRs, their user-friendly character, the increased shopping productivity and effectivity, and low expectations towards this novel e-commerce retail tool created customer satisfaction. Still, VFR technologies need more innovation in order to reach customer loyalty.

5.1.2 RQ2: What emotions do online customers experience after using virtual fitting room technologies?

The thematic analysis discovered relationships between customer enjoyment and customer emotions after the VFR experience. Indicators such as fun, helpful, and pleasant described the VFR experiences and caused emotions like happiness and joy among online customers. The low customer awareness and low expectations surprise VFR users. VFR is not commonly known among online customers since it is a new technology within e-commerce retail. As a result, VFR provoked surprise and triggered curiosity among its users. Furthermore, the opportunity to try out a new technology

created joy. On the other hand, the fast interactivity and ease of use created privacy concerns. Thus, VFRs' fast interactivity and novelty seem to trigger joy, surprise, and curiosity, but also discomfort.

These emotional VFR attachments contributed to inherent decision-making processes. The enhanced online shopping efficiency and perceived intangible benefits for the environment influence the relevance of VFR for online customers. VFRs could prevent overproduction and stock burns in online retail environments. However, these motivators to manage decision-making processes do not match with customer behaviors. The data reveals that customers are willing to share their pleasant and helpful VFR experiences but have not shared their experiences yet. This intention-behavior gap follows from low levels of convenience. Additionally, customers will not leave feedback about their VFR experience due to time-consuming reasons. For this reason, the high level of involvement and motivations but low time and effort of VFR's users provoke no customer feedback, influence, or referrals.

At this point, findings concerning interview data were discussed. The following section reflects on broader theoretical discussions regarding the implications of VFR technologies in e-commerce retailing.

5.2 Discussion

This section provides broader theoretical discussions concerning the environmental consequences of VFR technologies. Paragraph 5.2.1 and 5.2.2 discusses the environmental impact of e-commerce practices and elaborates on intangible firm performance outcomes, such as environmental issues. The theory of overview effect, as stated in the last part of this section, could provide a solution to these issues while its psychological effects can be implemented in new e-commerce retailing communication strategies such as the utilization of VFR technologies.

5.2.1 Impact on the environment

The increased online traffic and growing e-commerce activities contributed to the rise of packages and caused a massive waste of additional packaging, plastic airbags, and returns (Tencati et al., 2016, p. 35). According to the Environmental Protection Agency report in 2013, the US, Australia, and Canada represent approximately 30-35% of municipal solid packaging waste yearly generated (Tencati et al., 2016). This has significant consequences for the sustainability of both packaging materials and logistics. The concept of sustainable packaging can be determined as the "social aspects as well as environmental concerns related to product/package systems, its entire life cycle throughout each stage of the supply chain" (Nordin & Selke, 2010, p. 317). Integrating objectives of sustainable developments to business practices refer to what Nordin and Selke conceptualize as *environmentally-friendly packaging* (2020, p. 319). Environmentally-friendly packaging focuses on improving packaging materials, logistics, and supply chain management, in

which packaging's role in the supply chain embeds protection and "deliver the product to consumers in optimum condition" (Nordin & Selke, 2020, p. 320). Nevertheless, the concept of environmentally-friendly packaging has evolved into the holistic approach of sustainable packaging. Due to the rising environmental concerns, like increasing C02 emissions, e-commerce businesses are expected to meet the green motivated customer demand by providing recyclable package designs. These green motivated customers expect sustainable practices in the packaging industry (Nordin & Selke, 2020, p. 319). A study by the Information Research Institute in 2007 found, for instance, that "almost 30% of the customers ranked packaging as their second sustainability factor in the brand selection of products" (Nordin & Selke, 2020, p. 321).

However, other essential factors such as customer behavior or trends seem to be ignored throughout sustainable packaging decisions. Besides technological, environmental, and economic developments, the social element of sustainable packaging is often overlooked (Nordin & Selke, 2020, p. 320). While the economic profits and environmental benefits have been emphasized in sustainable packaging processes, many efforts to social initiatives are not examined. Sustainable packaging relies on both social implementations as well as technological developments. Therefore, customers' input and perceptions play an important role in advancing packaging system developments and should be involved in the supply chain.

5.2.2 Environmental awareness of sustainable packaging

Research has shown that environmental awareness has increased for both industrial manufactures and customers. A study by the Natural Marketing Institute in 2006 found, for example, that 17% of the customers are willing to shift their brand loyalty to green motivated companies that aim for sustainable packaging (Nordin & Selke, 2020, p. 320). However, low levels of convenience, brand value, and involvement negatively impact the relationship between customer emotions and indirect contributions of the intangible benefits to the environment (see Figure 7). There is a lack of customer involvement in sustainable packaging efforts, a significant thermology gap, and a behavior gap.

The lack of customers' knowledge on the concept of sustainable packaging has been acknowledged by Perception Research Services that investigated shoppers' perspectives on sustainable packaging (Nordin & Selke, 2020, p. 321). The study showed that most customers are unfamiliar with the concept of sustainable packaging and often confuse the term with "recycling." Recycled content is seen as one of the many sustainable packaging efforts but is not automatically involved in environmental labeling requirements. Also, a significant terminology gap between customers and firms created low levels of customer involvement which impacted sustainability promotions. Customer confusion, false perceptions, and varied interpretations of promotions efforts were found in the skeptical responses of customers (Nordin & Selke, 2020, p. 322).

The behavior-intention gap is another moderator in this study that impacts the relationship between customer emotions and indirect contributions of the intangible benefits to the environment. There is a low consistency between customers' attitudes and behavior regarding customers' motivations for sustainable products or packaging (Nordin & Selke, 2020). In other words, the willingness of customers does not always translate their behavior. Although the increased environmental awareness of customers is recognized in their behavior and willingness to act to those concerns, it is still not reflected in their willingness to pay more for sustainable packages (Nordin & Selke, 2020). A global consumers survey by McKinsey revealed that 53% of the customers were concerned about the environment but unwilling to take action in purchasing decisions (World Business Council for Sustainable Development, 2008). Instead, online impulsive buying behavior seems to be increased among customers. The online product return rate is estimated at around 30%, while offline stores encounter 8.89% product returns (Saleh, 2021). This is a consequence of the inability to try retail products on. It is estimated that 30% of e-commerce returns happen because of wrong sizing (Orendorff, 2019).

Besides that, e-commerce retail entails high return rates (Cullinane et al., 2019, p. 9). Customers' product returning behavior is stimulated by the customer-friendly policies of online retail stores. Processing these increased product returns results in both higher costs for retailers and a waste of resources for society (French, 2008). Thus, high rates of product returns are causing inefficient, costly issues for e-commerce retailers and the environmental footprint as well.

Barriers related to these purchase decisions and the unwillingness to pay more for sustainable packaging reflect on the low customer convenience. Customers seem to lack time and effort to invest in products or services that aim for sustainable purposes. Also, the inconsistency between customer attitudes regarding customer preferences for 'green' products and purchase behavior reflects on the low brand value of a firm. If e-commerce retailers want to achieve intangible benefits to the environment within their business model, they will have to improve indirect communication strategies with their customers. Only then, customer referrals, customer influence, and customer knowledge will lead to intangible benefits to the environment.

5.2.3 The overview effect: a theory to create environmental awareness

A way to create a cognitive shift in awareness in the customers' minds is by approaching them via new technological developments that appeal to the customer. A psychological effect that can contribute to a more profound understanding of consciousness in new contexts is implementing *the overview effect* in the customer engagement strategies. This powerful cognitive shift in awareness, also known as 'The Overview Effect', refers to the observation of planet Earth from space which triggers "overwhelming emotion and feelings of identification with humankind and the planet as a whole" (Yaden et al., 2016, p. 1). The conceptual approach of the overview effect was first identified by Frank White (1987), who recognized emotional experiences of space flights by

astronauts. White's reports discovered a set of characteristics that emphasize the experience of the overview effect: firstly the appreciation and perception of beauty, secondly unexpected emotion, and finally, an increased sense of connection to other people and the Earth as a whole (Yaden et al., 2016, p. 3). These intense states of emotions and self-consciousness by observing planet Earth from space provide a new approach in exploring awe-inspiring stimuli, its psychological effects, "and individual differences in sensitivity to such potentially transformative experiences" (Yaden et al., 2016, p. 2).

The theory of the overview effect is constructed through the psychological terms of awe and self-transcendence. *Awe* is characterized by intense emotions as consequences of observing something vast, such as perceiving Machu Picchu in Peru (Yaden, 2016, p. 4). It can occur in both natural and social environments. *Self-transcendence*, on the other hand, refers to the powerful subjective states of humankind. Experiencing awe and self-transcendence within the conceptual approach of the Overview effect can transform the ways "in which individuals understand and approach new concepts, and even affect the salience of familiar concepts" (Yaden et al., 2016, p. 5). Implementing this cognitive shift in awareness in the customers' minds through new e-commerce retailing technologies could indirectly contribute to the customer engagement and intangible benefits of the environment.

Businesses need to invest effort and time in the customer aspect of the supply chain to create environmental awareness through the theory of the overview effect. Excessive and unnecessary product usage impacts the environment. It is crucial to minimize this impact and reduce unnecessary packaging waste. Retailers must reconsider all aspects of their production processes throughout the supply chain to improve their environmental footprint (French, 2008). Finding a way to communicate and create environmental awareness that influences the purchase decisions of online customers is essential here. Customers should thus be encouraged to take action and be educated to realize that increased packaging use reflects customers' changing lifestyles and expectations (Nordin & Selke, 2020, p. 325). Improving communication that resonates with the end-users will indirectly contribute to the customer engagement and intangible benefits of the environment.

Therefore, e-commerce retailers could implement AR technologies, such as VFRs, within their marketing communication strategies. Via interactive functions and vivid product portrayals, new unique and different customer experiences can trigger awe and self-transcendence. Reaching these phycological effects can create a sense of environmental awareness in the customer's mind.

5.3 Conclusion

In conclusion, this study focused on exploring VFR technologies and investigated how AR technologies, such as virtual fitting rooms, enhance the customer experience in e-commerce retailing. Based on theoretical literature, qualitative in-depth interviews were conducted with twelve

participants and discussed the logic behind VFRs. Thematic analyses categorized the findings and discussed the perceptions of 1) VFR attributes, 2) the customer experience, 3) satisfaction with the experience, and 4) the emotions after the VFR experience. The interview results of these four main themes ultimately helped to provide an answer to the research questions of this research study.

Results have indicated that low customer expectations and high convenience created satisfaction among VFR users. In other words, the unfamiliarity with the novel technology, the fast and easy utilization, and increased shopping productivity contributed to the customer satisfaction. As a result, emotions such as joy, surprise, and curiosity occurred. VFR's efficiency and beneficial impact on the environment are relevant customer motivators to use VFRs.

Still, VFR technologies are perceived to be unnecessary due to their novelty. VFRs are new technologies that need more innovation and development in order to reach customer trust and loyalty. Moreover, low efforts and low VFR awareness created no customer knowledge, influence, or referrals. A customer behavior-intention gap remains present, despite some of the positive emotions after the VFR experience. Time and effort are therefore important indicators within the customer decision-making process. To summarize, VFRs convenience is a dominant precedent of customer purchase intentions, attitudes, knowledge, and responses. E-commerce retailers should thus mainly focus on customer convenience via VFR technologies in order to enhance the customer experience.

5.4 Limitations

Throughout this research, some limitations and implications for future research were found. Firstly, the generalizability of the results might be limited. The present study has a cross-sectional approach in which data was measured at one point in time. Interviews were executed during the corona pandemic in which a national lockdown occurred. As a result, customers were not able to visit retail stores and therefore forced to shop online. This could influence the overall generalization of the data results since customers might shop less online in another societal context. Besides that, this study entailed a small sample size in which some participants were gathered via purposive sampling. Therefore, it is likely to assume that the study results can mainly be applied to this setting and context. Future research could conduct similar research but instead, utilize a quantitative research approach in order to measure the (in)direct customer engagement and environmental awareness of VFRs. In this way, a bigger sample size could lead to higher generalizability of the findings.

5.5 Future research

This study served an exploratory purpose, and its objective was to generate a theory that can be used for future research. In addition to that, future research could examine the following question: How can AR technologies, such as virtual fitting rooms, contribute to the customer engagement and the

environment? Investigating the customer (in)direct customer VFR engagement while following the developed conceptual framework as proposed in Figure 8, will extend current research to a broader context. These insights could be precious for e-commerce retail businesses. Another research option is to adapt longitudinal observations to explore the generated theory further and include the customer behavioral component.

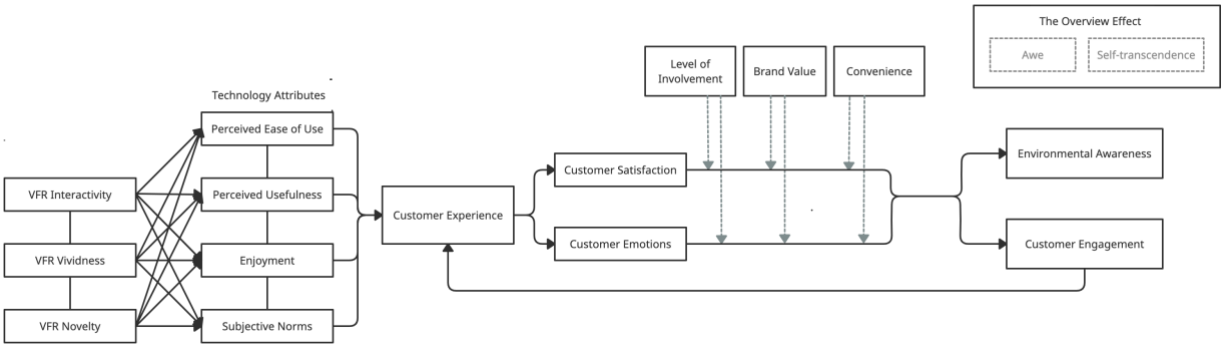

Figure 3.
The conceptual model for future research

6. References

Bagozzi, R. P., Gopinath, M., & Nyer, P. U. (1999). The role of emotions in marketing. *Journal of the Academy of Marketing Science*, *27*(2), 184–206.
http://doi.org/10.1177/009207039927005

Bowden, J. L.-H. (2009). The process of customer engagement: a conceptual framework. *Journal of Marketing Theory and Practice*, *17*(1), 63–74. https://www.jstor.org/stable/40470395

Brennen, B. S. (2017). *Qualitative Research Methods for Media Studies.* Milton: Taylor and Francis.

Bryman, A., & Bell, E. (2015). *Business research methods* (4th edition). Oxford: Oxford University Press.

Cullinane, S., Browne, M., Karlsson, E. & Wang, Y. (2019). Retail Clothing Returns: A Review of Key Issues. In Wells P. (Eds.), *Contemporary Operations and Logistics* (pp. 301-322). Palgrave Macmillan. https://doi.org/10.1007/978-3-030-14493-7_16

Dekker, B., & Okano-Heijmans, M. (2020). *Europe's Digital Decade?: Navigating the global battle for digital supremacy*. Clingendael Netherlands Institute of International Relations. https://www.clingendael.org/publication/europes-digital-decade

Flick, U. (2007). *Designing qualitative research.* London: Sage Publications.

Formex Swiss Made Watches. (2018, February 22). *FORMEX TryOn App Instruction Video 2.0* [Video]. YouTube. https://www.youtube.com/watch?v=yLnGjabCDD0

French, M. L. (2008). Improving sustainability through effective reuse of product returns: minimizing waste in a batch blending process environment. *Journal of Cleaner Production, 16*(15), 1679–1687. https://doi.org/10.1016/j.jclepro.2008.01.006

Hansemark, O.C. & Albinsson, M. (2004). Customer satisfaction and retention: the experiences of individual employees. *Managing Service Quality: An International Journal*, *14*(1), 40-57. https://doi.org/10.1108/09604520410513668

Heller, J., Chylinski, M., De Ruyter, K., Mahr, D., & Keeling, D. I. (2019). Let Me Imagine That for You: Transforming the Retail Frontline Through Augmenting Customer Mental Imagery Ability. *Journal of Retailing*, *95*(2), 94-114. http://doi.org/10.1016/j.jretai.2019.03.005

Kenney, M., & Zysman, J. (2016). The rise of the platform economy. *Issues in science and technology*, *32*(3), 61-69. https://issues.org/rise-platform-economy-big-data-work/#.YReNy_g2RY.link

Lu, Y., & Smith, S. (2008). Augmented reality e-commerce: How the technology benefits people's lives. In L. Pavlidis (Ed.), *Human Computer Interaction* (pp. 215-238). Intech. http://doi.org/10.5772/6301

MacInnis, D. J., & Price, L. L. (1987). The role of imagery in information Processing: Review and extensions. *Journal of Consumer Research, 13*(4), 473-491. http://doi.org/10.1086/209082

Magis, S., Zorfas, A & Leemon, D. (2015). The New Science of Customer Emotions: A better way to drive growth and profitability. *Harvard Business Review, 93*, 66-74. https://hbr.org/2015/11/the-new-science-of-customer-emotions

McLean, G., & Wilson, A. (2019). Shopping in the digital world: Examining customer engagement through augmented reality mobile applications. *Computers in Human Behavior, 101*, 210-224. http://doi.org/10.1016/j.chb.2019.07.002

Moroz, M. (2019). Tendency to Use the Virtual Fitting Room in Generation Y – Results of Qualitative Study. *Foundations of Management, 11*(1), 239-254. http://doi.org/10.2478/fman2019-0020

Nisar, T. M., & Prabhakar, G. (2017). What factors determine e-satisfaction and consumer spending in e-commerce retailing? *Journal of Retailing and Consumer Services, 39*, 135-144. https://doi.org/10.1016/j.jretconser.2017.07.010

Nordin, N., & Selke, S. (2010). Social aspect of sustainable packaging. *Packaging Technology and Science*, *23*(6), 317–326. https://doi.org/10.1002/pts.899

Ou, Y.-C., & Verhoef, P. C. (2017). The impact of positive and negative emotions on loyalty intentions and their interactions with customer equity drivers. Journal of Business Research, 80, 106-115. https://doi.org/10.1016/j.jbusres.2017.07.011

Pachoulakis, I. (2012). Augmented reality platforms for virtual fitting rooms. The International Journal of Multimedia & Its Applications, 4(4), 35-46. http://doi.org/10.5121/ijma.2012.4404

Pansari, A. & Kumar, V. (2017). Customer engagement: the construct, antecedents, and consequences. *Journal of the Acady of Marketing Science, 45*, 294–311. https://doi.org/10.1007/s11747-016-0485-6

Tangpong, C., Islam, M., & Lertpittayapoom, N. (2009). The Emergence of Business-to Consumer ECommerce: New Niche Formation, Creative Destruction, and Contingency Perspectives. *Journal of Leadership & Organizational Studies, 16*(2), 131–140. https://doi.org/10.1177/1548051809338054

Tencati, A., Pogutz, S., Moda, B., Brambilla, M., & Cacia, C. (2016). Prevention policies addressing packaging and packaging waste: some emerging trends. *Waste Management*, *56*, 35–45. https://doi.org/10.1016/j.wasman.2016.06.025

Orendorff, A. (2019, February 27) The Plague of Ecommerce Return Rates and How to Maintain Profitability. Shopify Plus. https://www.shopify.com/enterprise/ecommerce-returns

Saleh. K. (2021, April 11). E-commerce Product Return Rate – Statistics and Trends [Infographic]. Invesp. https://www.invespcro.com/blog/ecommerce-product-return-rate-statistics/

Souiden, N., Ladhari, R., & Chiadmi, N. -E. (2019). New trends in retailing and services. Journal of Retailing and Consumer Services, 50, 286-288. https://doi.org/10.1016/j.jretconser.2018.07.023

Steuer, J. (1992). Defining Virtual Reality: Dimensions Determining Telepresence. *Journal of Communication*, *42*(4), 73–93. https://doi.org/10.1111/j.1460-2466.1992.tb00812.x

Silverman, D. (2011). *Interpreting Qualitative Data: A Guide to the Principles of Qualitative Research.* SAGE Publications.

Verhoef, P. C., Lemon, K. N., Parasuraman, A., Roggeveen, A., Tsiros, M., & Schlesinger, L. A. (2009). Customer experience creation: Determinants, dynamics and management strategies. *Journal of Retailing, 85*(1), 31–41. http://doi.org/10.1016/j.jretai.2008.11.001

Vivek, S. D., Beatty, S. E., & Morgan, R. M. (2012). Customer engagement: exploring customer relationships beyond purchase. *Journal of Marketing Theory and Practice*, *20*(2), 127-145. https://doi.org/10.2753/MTP1069-6679200201

Wajcman, J. (2018). Digital technology, work extension and the acceleration society. *German Journal of Human Resource Management: Zeitschrift Für Personalforschung*, *32*(34), 168-176. https://doi.org/10.1177/2397002218775930

White, F. (1987). *The overview effect: Space exploration and human evolution.* Houghton Mifflin.

World Business Council for Sustainable Development. (2008) *Sustainable Consumption Facts and Trends: From a business perspective.* http://docs.wbcsd.org/2008/11/SustainableConsumptionFactsAndTrends.pdf

Yaden, D. B., Iwry, J., Eichstaedt, J. C., Slack, K. J., Zhao, Y., Vaillant, G. E., & Newberg, A. B. (2016). The overview effect: awe and self-transcendent experience in space flight. *Psychology of Consciousness: Theory Research, and Practice*, *3*(1), 1–11. https://doi.org/10.1037/cns0000086

Yim, M. Y., Chu, S., & Sauer, P. L. (2017). Is augmented reality technology an effective tool for e commerce?: an interactivity and vividness perspective. *Journal of Interactive Marketing, 39,* 89-103. http://doi.org/10.1016/j.intmar.2017.04.001

9. Appendices

9.1 Appendix A: Informed Consent

CONSENT REQUEST FOR PARTICIPATING IN RESEARCH

FOR QUESTIONS ABOUT THE STUDY, CONTACT:

Renée Koppens, rkoppens@live.nl, 00316155668688

DESCRIPTION

You are invited to participate in a research about Virtual Fitting Rooms. The purpose of the study is to understand how augmented reality, such as virtual fitting room technologies, enhance the customer experience in e-commerce retailing.

Your acceptance to participate in this study means that you accept to be interviewed. In general terms, the questions of the interview will be related to the customer experience of virtual fitting rooms.

Unless you prefer that no recordings are made, I will use a video recorder for the interview.

You are always free not to answer any particular question, and/or stop participating at any point.

RISKS AND BENEFITS

As far as I can tell, there are no risks associated with participating in this research. Yet, you are free to decide whether I should use your name or other identifying information, such as work related information, not in the study. If you prefer, I will make sure that you cannot be identified, by only mentioning age and gender.

I will use the material from the interviews and my observation exclusively for academic work, such as further research, academic meetings and publications.

TIME INVOLVEMENT

Your participation in this study will take 45-60 minutes. You may interrupt your participation at any time.

PAYMENTS

There will be no monetary compensation for your participation.

PARTICIPANTS' RIGHTS

If you have decided to accept to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty. You have the right to refuse to answer particular questions. If you prefer, your

identity will be made known in all written data resulting from the study. Otherwise, your individual privacy will be maintained in all published and written data resulting from the study.

CONTACTS AND QUESTIONS

If you have questions about your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact –anonymously, if you wish— Niels Vink at the following email niels@behavioralinsight.nl

SIGNING THE CONSENT FORM

If you sign this consent form, your signature will be the only documentation of your identity. Thus, you DO NOT NEED to sign this form. In order to minimize risks and protect your identity, you may prefer to consent orally. Your oral consent is sufficient.

I give consent to be audiotaped during this study:

Name Signature Date

I prefer my identity to be revealed in all written data resulting from this study

Name Signature Date

This copy of the consent form is for you to keep.

9.2 Appendix B: Interview Guide

Introduction (5 minutes)

Dear…,

Thank you for participating in this research. My name is Renée Koppens and I am a MA Media & Business student at Erasmus University Rotterdam. The Purpose of this study is to investigate how virtual fitting rooms can enhance the customer experience in e-commerce retailing. Your answers and feedback will be very valuable for this study. There are no risks associated with participating in this research. Yet, you are free to decide whether I should use your name or other identifying information not in this study. During the interview, I will make some notes while the interview will be reordered for later analysis. Information from the interviews and observations will be used exclusively for academic work and shared with Erasmus University.

This interview will take approximately one hour. Questions in this interview will be related to your customer experience of virtual fitting rooms and asks about satisfaction and emotions regarding your experience. You are always free to answer any particular question.

Before we start, do you have any questions on forehand?

List of topics:

1. General Questions
2. VFR Interactivity
3. VFR Vividness
4. VFR Novelty
5. Perceived Ease of Use
6. Perceived Usefulness
7. Enjoyment
8. Subjective Norms
9. Satisfaction with the Experience
10. Emotions with the Experience

Interview (50 minutes)

1. <u>General Questions</u>
    a. Could you tell me a bit about yourself?
        i. How old are you?
        ii. Where are you from?
        iii. What is your current position? (student/work)
    b. Could you tell me about your first VFR experience?
        i. When was the first time you came across VFR technologies?

ii. How were you introduced to VFR technologies?

iii. Which brand/business introduced you to VFR technologies?

iv. Have you been using VFR technologies more often after your first experience?

2. VFR Interactivity

Technological perspective:

a. How fast were you able to navigate and manipulate the VFR content in the mediated environment?

b. How similar was the VFR mediated content to the real world?

c. To what extent were you able to navigate and manipulate the VFR content in the mediated environment?

User Perspective:

d. How would you describe the control of your navigation through the VFR technology?

3. VFR Vividness

Technological perspective:

a. Could you describe the quality of the visual display through the VFR technology?

b. What were the sensory dimensions offered by the mediated environment? (sound, visuals etc.)

User perspective:

c. Where you able to memorize relevant product information after using VFR?

i. How does it differ from regular online shopping experiences?

d. To what extent do you feel unsure or confident using VFR technologies while shopping online?

e. Are you willing to rely on VFR technologies while doing online purchases? Why?

i. Do you feel confident/unsure that your online purchase is according to your preferences after using VFR?

4. VFR Novelty

a. To what extent does VFR offer something new or common to you compared with other online retail shopping technologies?

b. To what extent does VFR offer unique or familiar information comparable with other online retail shopping technologies?

c. Do you think VFR is something different compared to other online retail shopping technologies? Could you elaborate?

5. Perceived Ease of Use

a. Could you describe the perceived ease of use during your VFR experience?
    i. Did you find it easy or hard to learn how to use VFR?
    ii. Do you find the VFR features easy or hard to use?
    iii. Was it easy for you to become skilful at using VFR?
    iv. Did the VFR features do what you wanted them to do?
b. Could you elaborate on the interaction with VFR technologies throughout your experience?
    i. Was the interaction with VFR clear and understandable?
    i. Do you think that VFR technologies are flexible or complicated to interact with?

6. Perceived Usefulness
    a. How did VFR technologies enhance or diminish your online shopping experience?
        i. Did VFR enable you to accomplish shopping tasks more quickly?
        ii. Did VFR technologies enhance or diminish your shopping performance?
        iii. Did VFR increase or decrease your shopping productivity?
        iv. Did VFR enhance or diminish your shopping effectiveness?
        v. Did VFR technologies make it easier to shop?
        vi. Are VFR technologies useful? Why?

7. Enjoyment
    a. How would you describe your VFR experience?
        i. Was using VFR enjoyable?
        ii. Was using VFR pleasant?
        iii. Was using VFR fun?

8. Subjective Norms
    a. Does your social environment (parents, peers, idols) expect you to use VFR?
    b. Do you think that it is expected that people use VFR? Why? (societal relevance)

9. Satisfaction with the Experience
    a. How satisfied or rather dissatisfied are you with your VFR experience?
    b. To what extent was your VFR experience exactly what you needed?
    c. Has the VFR experience worked out as well as you thought it would?
    d. Do you think you will use VFR again in the future?

10. Emotions with the Experience
    a. How did you feel after using VFR?

b. To what extent are VFR's relevant or irrelevant to you? Explain your answer based on your inherent needs, values and interests.
c. Would you recommend VFR to your peers?
d. Have you shared your experience with others? If not, are you willing to share them?

Wrap Up (5 minutes)

This was the last question. Do you any final remarks or feedback that you would like to share with me? What did you think of the interview? I would like to thank you for your participating in this interview. If you have any questions, do not feel hesitate to contact me via e-mail or phone.

9.3 Appendix C: Codebook

Topic	Category	Code	Description	Example Quote
VFR Attributes *VFR Interactivity*	Speed	Fast	The control of what the interviewee sees through the real world and virtual worlds is believed to be fast.	*"I was surprised how fast I could start using it."*
		Fast: easy	The control of what the interviewee sees through the real world and virtual worlds is believed to be fast and easy.	*"It was pretty easy, and it had some basic steps as well, so you were good in control."*
		Fast: live camera	The VFR interaction is believed to be fast and conducted via live camera functions.	*"It was like immediately through your camera. It was quite fast."*
		Neutral	No specific opinion.	*"It depends on the website."*
		Slow	The control of what the interviewee sees through the real world and virtual worlds is believed to be slow.	*"When I was using the virtual fitting room, it was for some reason loading very slow."*
		Slow: multiple steps	The VFR interaction is believed to be slow and included multiple steps.	*"It was just like a bunch of steps."*
	Mapping	Realistic	The similarity of control in the virtual world to the real world is believed to be realistic.	*"It is really realistic because you can also turn your face and it's like totally 3D."*
		Unrealistic	The similarity of control in the virtual world to the real world	*"There is a significant difference between virtual try*

			is believed to be unrealistic.	*on and the real world."*
		Unrealistic: color	The similarity of control in the virtual world to the real world is believed to be unrealistic due to coloration.	*"The coloration wasn't exactly the same."*
		Unrealistic: lighting	The similarity of control in the virtual world to the real world is believed to be unrealistic due to lighting.	*"It doesn't necessarily take shadows or lighting into account."*
		Unrealistic: position	The similarity of control in the virtual world to the real world is believed to be unrealistic due to wrong positions of the 3D image.	*"Sometimes it also didn't quite match the angle I was taking and therefore the 3D image was partially blurred."*
		Unrealistic: texture	The similarity of control in the virtual world to the real world is believed to be unrealistic due to the lack of textures.	*"It didn't blend with your eyelid so there wasn't really some texture included."*
		Neutral	No specific opinion.	*"It depends."*
	Range	Broad	The number of possibilities in the VFR environment is believed to be broad.	*"You were able to map a lot of products."*
		Limited	The number of possibilities in the VFR environment is believed to be limited.	*"It had a very limited range. I think I could only try three or four of them."*

			Neutral	No specific opinion.	*"I don't remember exactly."*
		User perspective	Subjective perception control: positive	Individual's subjective perceptions of interactivity appears positive.	*"I experienced a high degree of control."*
			Subjective perception control: negative	Individual's subjective perceptions of interactivity appears negative.	*"It didn't really work. Also, the furniture wasn't really showing at first, so I was kind of annoyed by that."*
VFR	*Vividness*	Depth	Quality: good	The quality of the depicted information is believed to be good.	*"Most of the details are captured in."*
			Quality: bad	The quality of the depicted information is believed to be bad.	*"It kind of looked like very bad photoshop."*
		Breath	Sensory dimensions: irrelevant	Adding more sensory dimensions is believed to be irrelevant.	*"I don't feel like that's very necessary."*
			Sensory dimensions: relevant	Adding more sensory dimensions is believed to be relevant.	*"It could be very helpful for novel products."*
		Customer memory	Harder	Memorizing relevant product information after using VFR is believed to be harder compared to regular online shopping experiences.	*"I actually think my memory is less because I can only remember what it looked like and I didn't really read descriptions of products, whereas I would usually do that.*
			Improved	Memorizing relevant product information is	*"You tried it on yourself and then*

		believed to be better compared to regular online shopping experiences.	*you were able to memorize a little bit more about the product."*
	Hasn't changed	Memorizing relevant product information is believed to be similar to regular online shopping experiences.	*"It is the same as an online shopping experience. You just add the product to your basket."*
	Neutral	No specific opinion.	*"I guess that makes a bit of a difference, but I don't know if I've had enough experience with that, like with more relevant products."*
Customer trust	Privacy concern	The willingness to rely on VFR technologies is negative because of privacy issues.	*"I was a bit shocked with how easily my camera went on while the site had access to my data."*
	Prefer real-life shopping	The willingness to utilize VFR technologies is negative since interviewees still prefer to go to the store.	*"I really want to hold the products and feel it on my skin."*
	Doubtful	The willingness to rely on VFR technologies is believed to be doubtful.	*"I feel unsure about virtual try on."*
	Needs improvement	The willingness to utilize VFR technologies is negative since it is	*"There still needs to be a lot of innovation done."*

			believed that the technology needs improvement.	
		Positive	The willingness to rely on VFR technologies is positive.	*"I would be quite confident to buy it after trying it virtually."*
		Addition	The willingness to rely on VFR technologies is positive since it offers extra information.	*"It gives me an extra insight into products that I want."*
		Depends on the product	The willingness to utilize VFR technologies depends on the product.	*"It depends on the product that I am searching for."*
VFR Novelty	Familiarity with technology	General/familiar	Individual is familiar with the technology.	*"I already knew about this option."*
		New	The VFR technology is believed to be new.	*"I think it's very new. I didn't even know it existed until last week."*
		Unique	The VFR technology is believed to be unique.	*"I think it's unique. I haven't really seen anything like this before."*
		Personalized	The VFR technology is believed to be personalized.	*"After all it makes online shopping more personal and also more enjoyable."*
		Addition	The VFR technology is believed to offer extra dimensions to online shopping.	*"It is something extra that a company can offer to its customers."*
		Neutral	No specific opinion.	*"I am not super aware of other*

				online shopping technologies."
Customer Experience	Perceived Ease of Use	Easy	The VFR experience is perceived as easy.	*"I thought it was super easy."*
		Easy: Basic interface	The VFR experience is perceived as easy due to the basic interface.	*"It was very basic, but it didn't need to be more complicated."*
		Easy: fast	The VFR experience is perceived as easy and fast.	*"It was so easy to use, so after like two minutes I already knew my favourite lipstick color."*
		Hard	The VFR experience is perceived as hard.	*"It was a little bit hard to change the combinations."*
		Hard: multiple steps	The VFR experience is perceived as hard and included multiple steps.	*"Inefficient, I would say, because I had to scan my face multiple times."*
		Hard: slow	The VFR experience is perceived as hard and slow.	*"The fact that it was sometimes loading too long, or that I had to download an app made me feel less invested in the experience."*
		Young vs. old	The perceived ease of use differs between generations.	*"When I see my grandparents with an iPad, for example, I think they would find it difficult."*
		Neutral	No specific opinion.	*"I think it could be easy depending on*

				what products you are looking for."
	Perceived Usefulness	Enhanced	The VFR technologies enhanced the online shopping experience.	*"It is more efficient because I could cross off certain frames that I didn't like."*
		Enhanced: faster	VFR enables to accomplish shopping tasks more quickly.	*"I was faster done than in the store."*
		Enhanced: return less	VFRs are believed to be useful because interviewees would return less.	*"It enhances my shopping performance, and I can imagine that I would return less."*
		Diminished	The VFR technologies diminished the online shopping experience.	*"I was drowned by all the product offerings, while I thought they all looked very much alike."*
		Diminished: time consuming	The VFR technologies diminished the online shopping experience because it was time consuming.	*"I don't know about more quickly, because a lot of times I was just kind of messing around with it. I was clicking on stuff that I would normally not search for."*
		Potential	The VFR usefulness is believed to have potential in the future.	*"I think there is definitely potential there."*
		Pre-work	The VFR experience is perceived as useful because it enables to	*"It's like a knockout system. So, if I didn't like the glasses*

			cross off the products which increases the shopping productivity in the store.	*during my VFR experience, I probably wouldn't have tried those models in the store."*
		Neutral	No specific opinion.	*"Neutral, because I was just orientating."*
	Enjoyment	Positive	The enjoyment of the VFR experience was positive.	*"I really enjoyed it. It was a nice experience."*
		Positive: pleasant	The VFR experience was pleasant.	*"It was pleasant and useful."*
		Positive: helpful	The VFR experience was helpful.	*"I thought it was really helpful."*
		Positive: fun	The VFR experience was fun.	*"It's a new technology and it's really fun to try it out."*
		Negative	The enjoyment of the VFR experience was negative.	*"I felt a little bit uncomfortable."*
		Negative: annoying	The VFR experience was annoying.	*"It took some time and things were loading slow so that was a bit frustrating."*
	Subjective Norms		The perceived social pressure on the behavioural construct.	*"I feel like our society is pretty focused on consumerism. And I think that this kind of technology increases that."*
		Corona situation	The perceived social pressure on the	*"I try not to order online, but now with*

			behavioural construct due to Corona.	*the COVID pandemic, obviously I had to, and I felt so guilty when I had to send something back."*
		Environment	The perceived social pressure on the behavioural construct regarding the environment.	*"People will order less unnecessary things so return packages will reduce while less overproduction will be accomplished."*
		Low expectations	The perceived social pressure is low since the social environment is not commonly known with the technology.	*"I never had a conversation with anyone about it. I don't think it's that commonly known."*
		Relevant in the future	Utilizing VFR is expected to be more relevant in the future.	*"It still feels like something that becomes normal in the future."*
Satisfaction with the Experience	Positive	Surprised	Judgement that the VFR experience provided positive levels of consumption-related fulfilment.	*"I was really surprised how easy, quick and user friendly it was."*
		Satisfied	Judgement that the VFR experience provided positive levels of consumption-related fulfilment.	*"Overall, really satisfied. I think on a skill of zero to ten, eight."*
		Helped to make decisions	Judgement that the VFR experience provided positive	*"I feel like it does really help you to make decisions."*

			levels of consumption-related fulfilment.	
		Convenience	The VFR experience is believed to be convenient.	*"It was pretty convenient."*
		Expectations	The expectations of the quality regarding the VFR experience were met.	*"Even better. I think I didn't really have high expectations. So, better than I expected."*
	Neutral	Addition	The VFR technologies is believed to be an addition to online shopping.	*"It's more of an added advantage."*
		Didn't know it was needed	The participant didn't know that the VFR experience was something that he/she needed.	*"It isn't something that I thought I needed."*
	Negative	Dissatisfied	Judgement that the VFR experience provided negative levels of consumption-related fulfilment.	*"So, dissatisfied that I couldn't try on the colors that I was interested in."*
		Needs improvement	Judgement that the VFR experience provided negative levels of consumption-related fulfilment.	*"I think the technology is not that advanced yet."*
		>Effort & time	The VFR experience is believed to be inconvenient.	*"Maybe it did require some extra effort from the customer."*
Emotions with the Experience	Positive		Positive emotions with the VFR experience.	*"It was a nice experience, so yes I was kind of happy."*

	Negative		Negative emotions with the VFR experience.	*"I felt a bit insecure, because I still wasn't sure whether the glasses were exactly the same as the looked through the virtual try on."*
	Customer referral	Shared experience	Interviewee shared VFR experience with his/her social environment.	*"I was talking a lot about it with my friends. I got them onto it and that's how we were able to furnish the house."*
		Didn't shared experience	Interviewee did not shared VFR experience with his/her social environment.	*"I didn't share it yet."*
		Willing to share experience	Interviewee has not shared his/her VFR experience but is willing to share it.	*"I have not yet, but I think I will whenever it comes up."*
	Customer Feedback	Leave feedback	Interviewee would leave feedback about his/her VFR experience.	*"I am all about feedback, so yes I would definitely give feedback."*
		Won't leave feedback	Interviewee would not leave feedback about his/her VFR experience.	*"No, I'm not really into that. But I don't actually do that in general."*
	Customer Recommendations	Recommend	Interviewee would recommend VFRs to his/her social environment.	*"I would definitely recommend VFR because I was satisfied."*

		Wouldn't recommend	Interviewee would not recommend VFRs to his/her social environment.	*"I wouldn't recommend it to my parents."*
	Perceived Relevance	Relevant: environment	VFR technologies are believed to be relevant due to sustainable principles.	*"From a sustainability and environmental point of view, I think it's very good."*
		Relevant: efficiency	VFR technologies are believed to be relevant because of their efficiency.	*"Also, from an ease-of-use perspective, because if you have to return your products, it always takes a lot of time before you get your money back."*
		Irrelevant	VFR technologies are believed to be irrelevant.	*"For now, I don't need it, so in that case it isn't really relevant."*
		Still go to the shop	Interviewee would still prefer to go to the store.	*"I would still go to the store."*