

# **Marketing in Virtual Realities**

Master Seminar Thesis

Chair of Quantitative Marketing

Prof. Dr. Florian Stahl

Advisor:

University of Mannheim

Spring term 2022

by

*First and last name:*

*Matriculation number:*

*Field of studies:*

*Address:*

*Telephone:*

*E-mail:*

Mannheim, Date

## Table of Content

<b>List of Tables.....</b>	<b>III</b>
<b>List of Abbreviations.....</b>	<b>IV</b>
<b>Abstract.....</b>	<b>V</b>
1. Introduction .....	- 1 -
2. Theoretical Background Virtual Reality .....	- 2 -
2.1 Virtual Reality Technology .....	- 2 -
2.2 Virtual Environments, Worlds and the Metaverse .....	- 4 -
2.3 Conceptual Definition of VR in Marketing.....	- 5 -
2.4 VR Challenges and Adoption .....	- 7 -
3. Recent Literature Findings on VR User Experience .....	- 9 -
3.1 Conceptual Review of User Information Processing Models .....	- 9 -
3.2 Immersion and Vividness .....	- 11 -
3.3 (Tele-)Presence .....	- 12 -
4. Recent Literature Findings on the Impact of VR on Customer Experience and Marketing Objectives along the Customer Journey .....	- 17 -
4.1 Conceptual Review of VR Customer Experience and Journey.....	- 17 -
4.2 Impact of Virtual Product/Brand Presentations in the Pre-Purchase Stage.....	- 18 -
4.2.1 Product learning. ....	- 18 -
4.2.2 Branding and brand attitudes.....	- 19 -
4.2.3 Product development and design.....	- 20 -
4.3 Impact of Virtual Product/Brand Presentations in the Purchase Stage .....	- 21 -
4.4 Impact of Virtual Product/Brand Presentations in the Post-Purchase Stage .....	- 23 -

5. Conclusion.....	- 24 -
5.1 Theoretical Contribution.....	- 24 -
5.2 Managerial Implications .....	- 25 -
5.3 Directions for Future Marketing and Consumer Research .....	- 25 -
<b>Tables.....</b>	<b>- 27 -</b>
<b>Appendices .....</b>	<b>- 28 -</b>
<b>References .....</b>	<b>- 39 -</b>
<b>Affidavit.....</b>	<b>- 46 -</b>

## List of Tables

Table 1: 2x2 VR Archetypes Matrix .....	- 26 -
---	--------

## List of Abbreviations

HMD	Head-Mounted Display
R&D	Research and Development
TAM	Technology Acceptance Model
VR	Virtual Reality

## Abstract

In an increasingly competitive business environment, companies are in search for innovative ways to provide customers with engaging and high-quality product and brand experiences. Technologies such as Virtual Reality (VR) help marketers achieve their marketing goals by facilitating customer experience and decision-making at each stage of the customer journey. However, remaining technological challenges and data privacy concerns must be resolved, so that marketers can exploit the full potential of VR in the future. This seminar paper reviews current marketing and consumer literature for understanding the impact of VR on user perceptions and behaviours as well as marketing success. The review shows that today's VR solutions are able to immerse users in interactive simulations that give them the feeling of being physically present. VR can thus be considered a valuable marketing tool with applications ranging from product design, brand management and promotion to virtual shopping. This paper provides marketers and scholars with a systematic review of the current state of marketing and consumer research on VR.

*Keywords: Virtual Reality, Marketing, Metaverse, Customer Experience, (Tele-)Presence, Immersion*

## 1. Introduction

Digital media are on the rise. In recent years, consumers have increasingly turned to use online and virtual retail spaces. This shift in consumer shopping behaviour is expected to prevail in the long-run and provides marketers with exciting new opportunities to engage consumers online (Kannan 2020, p. 441; Luangrath et al. 2022, p. 1).

One of the most promising digital media is VR. In the past, high technological requirements hampered its commercial use. However, through the improved capabilities of today's technologies, most of these limitations are phasing out (Boyd and Koles 2019b, p. 592). Consequently, leading technology companies such as Facebook and HTC are investing heavily in the development of high-end headsets such as the Oculus Rift and HTC Vive. This makes VR solutions finally available for the mass-market. Moreover, VR is expected to have a huge impact on the marketing domain (Laurell et al. 2019, p. 1; Wedel et al. 2020, p. 457). This new medium provides marketers with novel ways to engage customers through memorable and high-impact VR content. In virtual environments, users can explore and interact with products in a realistic, controllable, and customizable way. Given its inherent flexibility, VR has the potential to create unique and high-quality customer experiences (Barnes 2016, p. 4). Especially, the retail industry signals interest in this rising technology and is investing heavily in the creation of virtual retail stores (e.g. eBay and IKEA) (Xi and Hamari 2021, p. 37). Besides online shopping, VR applications in the fields of market research, promotion, customer service and brand management are also very promising (Barnes 2016, p. 4).

A significant body of interdisciplinary research on VR has evolved over time, especially in the academic fields of computer science, engineering, neuroscience, and psychology (Han et al. 2020, p. 311; Wedel et al. 2020, p. 444). However, the marketing domain showed little interest in this topic until a few years ago (Hollebeek et al. 2020, p. 6). Due to technological

advances in the field of VR and increasing technology acceptance, VR marketing and consumer research has gained in relevance in recent years (Hollebeek et al. 2020, p. 6; Wedel et al. 2020, p. 457).

This seminar paper aims to explore the impact of VR features on user perceptions and behaviours as well as marketing success. For this purpose, the paper reviews recent findings in marketing and consumer research on VR. The objective is to answer the following research questions: (1) How is VR conceptualized in the context of marketing? (2) How do consumers experience and process information in VR and which impact do VR features have on consumer psychology and behaviours? (3) Which impact do virtual product presentations have on customer experience and the achievement of companies' key marketing goals? In order to answer these questions, this seminar paper proceeds as follows: First, a theoretical background on VR technology, the characteristics of virtual environments (e.g. Metaverse), and the concept of VR in marketing is given. This first chapter also sheds light on key challenges and the adoption and acceptance of VR technology. The second section resumes recent research findings on VR user experience and its underlying psychological concepts. In the third part, VR customer experience is conceptualized and the impact of VR features on marketing objectives along the customer journey is investigated. Lastly, this paper proposes directions for future marketing and consumer research.

## **2. Theoretical Background Virtual Reality**

### ***2.1 Virtual Reality Technology***

When referring to VR, scholars have different perceptions of technological systems in mind. The rapid pace of technological progress in this field makes it difficult to use the VR term in a non-arbitrary way (Kang et al. 2020, p. 71). Hollebeek et al. (2020, pp. 10-11) developed a 2x2



VR archetypes matrix, which helps to classify existing and future VR innovations into appropriate and distinct categories (see Table 1). This matrix differentiates between stand-alone VR hardware tools (e.g. Oculus Go) and VR software programs used in host devices (e.g. Google Cardboard applications), as well as VR-centric tools that feature sole VR functionality (e.g. Sony Smart Eye Glass) and non-VR centric tools with other major functions (e.g. smartphone) (Hollebeek et al. 2020, p. 10).

- INSERT TABLE 1 ABOUT HERE -

For the remainder of this report, any mention of VR technology will primarily refer to autonomous VR-centric hardware devices (e.g., Microsoft's HoloLens) (Hollebeek et al. 2020, p. 10).

VR technology enables users to experience an ever-improving illusion of another reality. This experience encompasses the exploration and interaction with a three-dimensional environment that does not necessarily resemble the real world (Berg and Vance 2016, p. 1; Laurell et al. 2019, p. 2; Xi and Hamari 2021, p. 2). VR users perceive the computer-generated simulation via one or more of the five perceptual senses: vision, hearing, touch, smell and taste (Wedel et al. 2020, p. 443; Xi and Hamari 2021, p. 2). Typically, the VR user wears a headset that completely obscures his or her vision and watches visual data on a built-in screen. This type of device is referred to as head-mounted display (HMD). Apart from HMDs, VR can be visualized via single large projection screens (i.e. powerwall), multiple connected projection screens (i.e., CAVE) or stereo-capable monitors with desktop tracking (Berg and Vance 2016, p. 1; Farah et al. 2019, p. 140; Laurell et al. 2019, p. 2). Furthermore, the user can perceive simulated sounds using headphones, single speakers, or full surround systems (Berg and Vance 2016, p. 2; Laurell et al. 2019, p. 2). High-end interactive devices can additionally enhance the user experience by making use of motion and touch tracking, which allows the user to interact with simulated objects (Alzayat and Lee 2021, p. 348; Laurell et al. 2019, pp. 1-2). For this

purpose, handheld controllers or other haptic devices can be used. These powerful tools allow users to manipulate simulated objects and navigate through the virtual environment. At the same time, they can provide users with haptic feedback (through physical manipulators), which potentially simulates the perception of vibration, wind, temperature, and pressure within the virtual environment (Berg and Vance 2016, p. 2). Beyond that, current high-end HMDs use gyroscope technology to track and truthfully simulate head movements in the virtual world (Berg and Vance 2016, p. 2; Farah et al. 2019, p. 137). Nowadays, a large number of tracking systems exists (optical, magnetic, ultrasonic, inertial, etc.), which coupled with gesture recognition algorithms allow to translate natural body movements into virtual interaction (Berg and Vance 2016, p. 2). In contrast to the other senses, smell and taste are hardly considered in VR simulations (Berg and Vance 2016, p. 1).

## ***2.2 Virtual Environments, Worlds and the Metaverse***

VR technology enables individuals to experience and interact with virtual spaces and objects that give the user the illusion of being physically present (Loureiro et al. 2021, p. 288; Pizzi et al. 2020, p. 502). The resulting ‘virtual world’ may be defined as “an electronic environment that visually mimics complex physical spaces, where people can interact with each other and with virtual objects, and where people are represented by animated characters” (Bainbridge 2007, p. 472). This environment may look and behave like reality or could be partly or completely different (Hollebeek et al. 2020, p. 7). Additionally, the interactivity provided by VR may vary (Hollebeek et al. 2020, p. 7)

Leading technology companies are already building virtual worlds. Meta, formerly known as Facebook, recently published its plans to create a virtual world, called Metaverse. At the same time, consumer brands such as Coca-Cola and Gucci are expanding in virtual environments such as the so-called ‘Decentraland’ (Chen and Yao 2022, p. 524; Kim 2021, p. 141).

Because of its complexity, it is not clear how virtual worlds such as the Metaverse could look like. While some envision it as the Web 3.0, others imagine it as a fully digital world that exists in parallel to our own reality (e.g. similar to OASIS in movie Ready Player One) (Kim 2021, p. 141). Across all prevalent visions of the metaverse, Kim (2021, p. 142) identifies “continuity (or persistence) of identity and objects, a shared environment, the use of avatars (or embodied self), synchronization, being three dimensional (or virtual), interoperability, and a user experience that is interactive, immersive, and social” as common attributes.

### **2.3 Conceptual Definition of VR in Marketing**

Early attempts to conceptualize VR date back to 1970. Sutherland (1970) was among the first to envision VR as “a model of the real world that is maintained in real-time, sounds and feels real, and which the user can manipulate directly and realistically” (Boyd and Koles 2019a, p. 441). Most of these early VR studies focus on the technical prerequisites and capabilities of VR technology. As a result, early definitions of VR mainly emphasize hardware requirements (i.e. headsets, computers, gloves etc.) and the technological interplay between devices (Boyd and Koles 2019a, p. 441; Steuer 1992, p. 73).

However, as following studies point out, these early technological definitions of VR cannot serve as a conceptual framework for (managerial) decision-making and research. This is due to the lack of insights into the processes and effects of VR usage (Steuer 1992, p. 73). Even though a wide variety of definitions have evolved over time across diverse academic disciplines, there is a general consensus that VR stands out from other media in that it gives the user a heightened sense of ‘being present’ in the simulated world (Kang et al. 2020, p. 71; Schroeder 2008, p. 2). Consequently, Steuer (1992, p. 76) defines “the experience of presence in an environment by means of a communication medium” as telepresence and conceptualizes VR as “a real or simulated environment in which a perceiver experiences telepresence”. This concept is particularly useful for marketing research because it allows to define VR without

reference to a particular hardware system, enabling technology to vary along several dimensions. Following studies adopt this viewpoint and focus their research on the exploration of user presence and the nature and characteristics of VR user experience rather than technological details. While the role of technology in simulating VR is further acknowledged, this shift in perspective promotes research on perceptual processes and individual differences, which are primary determinants of user experience (Boyd and Koles 2019a, p. 441; Steuer 1992, pp. 74, 76-77, 79).

Telepresence and immersion are the main factors describing VR experience. While the concept of telepresence explains VR experience from the psychological side, the concept of immersion adopts a physical point of view (Meissner et al. 2020, p. 220). Among other definitions, immersion is described as “the feeling of being encircled by a digital environment” (Farah et al. 2019, p. 138). Given the explanatory power of this concept, researchers often refer to VR as immersive computing technology (Berg and Vance 2016, p. 1; Boyd and Koles 2019a, p. 441; Boyd and Koles 2019b, p. 592). Brooks (1999, p. 16) contributes to this designation by defining VR experience as an encounter in which "the user is effectively immersed in a responsive virtual world". This enables the user to exercise “dynamic control over his or her viewpoint” (Boyd and Koles 2019b, p. 592). Most other researchers adopt this comprehensive definition of VR experience (Berg and Vance 2016, p. 3; Boyd and Koles 2019a, p. 441). Beyond that, Berg and Vance (2016) highlight the inherent complexity of VR in their definition. They refer to VR as a "set of technologies that enable people to immersively experience a world beyond reality" (p. 1). Boyd and Koles (2019a, p. 441) take this definition to the end by adding that VR enables people to “engage in human encounters that mimic their own interpretation of the world around them”.

## **2.4 VR Challenges and Adoption**

Even though, there are high expectations for VR, lower prices for commercial HMDs, and huge time and monetary investments made by companies, the adoption rates of VR technology remain disappointing (Han et al. 2020, p. 316; Laurell et al. 2019, p. 2; Meissner et al. 2020, p. 228). It is therefore crucial to understand barriers to adoption of VR technology (Laurell et al. 2019, p. 1).

From a technological perspective, the current under-developed VR infrastructure and standards represent one main issue. Due to the existence of many competing platforms, such as Facebook, HTC and Sony, different standards in regard to hardware (e.g. screen) and software development (e.g. operating system, video content) have evolved. This market fragmentation represents a barrier to growth (at least until a uniform standards evolves or one standard becomes ‘dominant’) (Barnes 2016, p. 32). The realistic and vivid representation of VR interactions represents another major challenge. Berg and Vance (2016, p. 13) point out that in VR design a trade-off between frame rates (important for interactive simulations) and geometry complexity exists, which makes it necessary to examine user needs more closely. Accurate tracking of hand movements, with at least six degrees of freedom, and the provision of sensory feedback to users in a realistic manner (sufficient depth of sensory information in each perceptual channel, e.g. haptics and sound propagation) are very difficult to implement (Harz et al. 2021, p. 20; Meissner et al. 2020, p. 220; Steuer 1992, p. 83; Wedel et al. 2020, p. 446). Ultimately, a poor implementation of VR technology can result in a bad user experience, impeding further VR adoption. Imperfections in spatial placement of products as well as size and colour rendering have the potential to affect the user’s sense of balance and inertia. This can subsequently lead to a feeling of sickness, referred to as motion sickness (Barnes 2016, p. 31; Wedel et al. 2020, p. 450). Finally, programming VR is still very complex and costly,

and companies often lack the required technological expertise to implement the technology into their organization (Barnes 2016, pp. 31-32; Harz et al. 2021, p. 19).

In the context of VR, companies are confronted with the handling of an increasing amount of granular customer data. This may be beneficial to better understand customers, but also increases the pressure on companies to preserve data privacy (Kannan 2020, pp. 441-442). Udo (2001) defines privacy as “prerogative of individuals and companies to decide how, when, where and how much information about themselves they want to share with others” (de Jong et al. 2021, p. 6). Customers and partner organizations may be increasingly concerned about the use and safety of their information (Barnes 2016, p. 11; de Jong et al. 2021, p. 6; Wedel et al. 2020, p. 450). Moreover, in the future, privacy regulators are expected to adjust privacy regulations according to technological developments. Thus, companies should be attentive to develop measures for securing data privacy, going beyond existing privacy regulations and building up a transparent and coherent data privacy policy. This may also reward companies with a competitive edge, granting them trust from involved partners and customers (de Jong et al. 2021, pp. 6-7).

To understand adoption of new technologies, most researchers refer to the Technology Acceptance Model (TAM) (Han et al. 2020, p. 312). This theoretical model investigates consumers' attitudes and behaviour by considering two main technology adoption factors: perceived ease-of-use and perceived usefulness. The TAM postulates that external variables such as social or technological factors, associated with a new technology, influence the user's feeling of perceived usefulness and ease-of-use. This consequently affects consumers' attitudes and behaviours toward this technology (Davis et al. 1989, pp. 985-986).

Alternatively, Laurell et al. (2019, p. 2) suggest that customers adopt a technology if the perceived total value provided by the technology exceeds its price. Furthermore, they determine the total value provided by the technology to the user as the sum of the technology's stand-

alone and network externalities' value. First, the technology's stand-alone value refers to the utility the technology brings to the user with its inherent functionality as a basis. Second, a technology's network externalities' value stems from the size of the installed base (number of other customers using the technology) as well as the access to complementary products or services. Consequently, the attraction of third-party developers to a technology receives significant consideration in this model because it can slow down the rate of adoption (Laurell et al. 2019, p. 2).

In line with the predictions of the TAM, Loureiro et al. (2021, p. 288) point out that a technology's perceived enjoyment, usefulness and ease of use positively impact its adoption. Research also emphasizes that practitioners can have a positive impact on consumer adoption by enhancing familiarity and confidence of VR usage and generating key benefits for consumers (Meissner et al. 2020, p. 228; Wedel et al. 2020, p. 458). Furthermore, Boyd and Koles (2019a, p. 444) identify enjoyment as a main driver of VR adoption. Therefore, they suggest that the practitioner's ultimate goal should be to create an enjoyable experience for the user. Finally, there is evidence that the feeling of telepresence is also positively related to VR adoption (Meissner et al. 2020, p. 220).

### **3. Recent Literature Findings on VR User Experience**

#### ***3.1 Conceptual Review of User Information Processing Models***

VR technology enables humans to experience virtual environments by simulating their senses and correspondingly their information processing systems (Berg and Vance 2016, p. 2). This human experience process is illustrated by the S-O-R framework. It specifies that "when an individual is exposed to an external stimulus (S), the inner organism changes (O), which precedes behavioural responses (R)" (Loureiro et al. 2021, pp. 288-289). In course of the VR

experience, the interplay and corresponding evaluation of all environmental cues have the potential to give the user the feeling of being in a different world. This so-called escapism experience is an important realm of experience and influences the user's cognitive and emotional states. The user has the feeling of leaving the real world and all related concerns behind and focuses on cognitively processing virtual environmental cues and ultimately forms emotions based on this realisations (Loureiro et al. 2021, pp. 288-289, 295).

Regarding the cognitive processing of environmental cues, VR researchers usually refer to the flow theory (Cowan et al. 2021, p. 87). The term 'flow' refers to a cognitive state of optimal user experience, in which the user is fully immersed into the virtual environment and focuses entirely on the interaction with the virtual environment (Han et al. 2020, p. 312; Hoffman and Novak 1996, p. 57). Hoffman and Novak (1996, p. 57) further describe the state of flow as "characterized by a seamless sequence of responses facilitated by machine interactivity, intrinsically enjoyable, accompanied by a loss of self-consciousness, and self-reinforcing". As a result of experiencing flow, users cognitive processing efforts are elevated, which leads to increased learning, exploratory and participatory behaviours as well as a greater feeling of enjoyment (Cowan et al. 2021, p. 87; Han et al. 2020, p. 312; Hoffman and Novak 1996, p. 57). To experience flow a set of antecedent conditions must be met. First, focused attention is a prerequisite for the experience of flow. Focused attention refers to the process of narrowing attention to a limited stimulus field (Hoffman and Novak 1996, p. 60). Second, research in this field suggests that telepresence and immersion precede the state of flow by increasing the user's focused attention (Cowan et al. 2021, p. 87; Han et al. 2020, p. 312; Hoffman and Novak 1996, p. 57). Third, to remain in the state of flow, the challenges individuals face in the virtual environment must match the skills of the user. There is the risk that the individual feels bored if he is underchallenged (skills exceed the challenges). On the other side, he or she may feel anxious when confronted with challenges that surpass the user's



skills (Hoffman and Novak 1996, p. 60). Hoffman and Novak (1996, p. 60) define skills “as the consumer's capacities for action”, and challenges as “the opportunities for action available to the consumer”. Thus, for flow to happen it is necessary that skills and challenges remain in balance. This implies that the user should face higher challenges, when getting more experienced with the virtual environment (Han et al. 2020, p. 312; Hoffman and Novak 1996, p. 60). Fourth, research reveals that the feeling of body ownership and control also strengthens the experience of flow (Han et al. 2020, p. 312). Finally, it is important to acknowledge individual heterogeneity and differences in motivation. The ability to experience flow and the optimal stimulation level varies across individuals (Hoffman and Novak 1996, p. 61; Steuer 1992, p. 80). Furthermore, individuals may show goal-directed or experiential behaviour. Therefore, it is important to consider the context of VR usage (Hoffman and Novak 1996, p. 62).

### **3.2 *Immersion and Vividness***

Researchers consider VR experience from the physical (immersion) as well as the psychological (telepresence) perspective (Meissner et al. 2020, p. 220). In this vein immersion refers to “the feeling of being encircled by a digital environment” (Farah et al. 2019, p. 138) and “the objectively measurable property of presence” (Ahn and Bailenson 2011, p. 94). The immersion concept is strongly related to flow theory. A high state of immersion expresses that the individual is fully immersed in the virtual environment, blocks out the real world around him or her, and pays focused attention to virtual objects and events (Loureiro et al. 2021, p. 289; Pizzi et al. 2020, p. 503). This can induce the feeling of presence (telepresence) in the virtual environment (de Regt et al. 2021, p. 514; Pizzi et al. 2020, p. 503). VR potentially leads to higher levels of immersion, given its ability to provide the user with a vivid and interactive experience (Ahn and Bailenson 2011, p. 94; Pizzi et al. 2020, p. 503). HMDs provide a

surrounding illusion of reality to the user and are therefore particularly suitable for creating a high level of immersion (Meissner et al. 2020, pp. 220-221).

The level of immersion provided by VR depends on the characteristics of the underlying VR system (i.e. input, output devices and VR content) and its ability to deliver a vivid and interactive illusion of reality by engaging the user's perceptual senses (Ahn and Bailenson 2011, p. 94; Boyd and Koles 2019a, p. 443; de Regt et al. 2021, p. 514). According to Slater and Wilbur (1997, p. 3) immersion is "the extent to which the computer displays are capable of delivering an inclusive, extensive, surrounding and vivid illusion of reality to the senses of a human participant". While inclusiveness describes the "extent to which physical reality is repressed", extensiveness "determines the range of sensory modalities stimulated" (Meissner et al. 2020, p. 220). Furthermore, a panoramic field of vision offers the user a surrounding experience (Meissner et al. 2020, p. 220). Finally, vividness refers to the perception of the user that the virtual environment is detailed, lively and easy to imagine and remember (Harz et al. 2021, p. 13). The more vivid a VR environment, the richer is the representation of the virtual environment in terms of information and responses to user's senses (Hollebeek et al. 2020, p. 8; Steuer 1992, p. 81). The breadth (number of body's five sensory systems engaged) and depth (quality of sensory feedback provided) of the perceptual simulation are the main factors determining a system's vividness (Barnes 2016, p. 6; Steuer 1992, p. 81). The vividness of a medium may influence the user's perception of the environment as real (Klein 2003, pp. 44-45). In the future, through the optimization of VR technologies, it may no longer be possible to distinguish the real world from the virtual one (Steuer 1992, p. 84).

### **3.3 (Tele-)Presence**

The main goal of VR is to create a virtual environment that is as realistic as possible (Meissner et al. 2020, p. 220). This can make the user feel a sense of presence. Steuer (1992) conceptualizes this mental state as telepresence. While he defines presence as "the experience

of one's physical environment", telepresence is referred to as " the experience of presence in an environment by means of a communication medium" (Steuer 1992, pp. 75-76). When individuals use VR, they perceive the real and the simulated world simultaneously. Telepresence occurs when the user perceives virtual sensory input in a way that the he or she forms the belief that his or her actions impact the virtual environment and ultimately the individual experiences a feeling of physical existence in the simulated environment (Wedel et al. 2020, p. 446). For telepresence to emerge, it does not matter, whether the simulated environment is a temporally or spatially distant real, or an animated but non-existent environment (Steuer 1992, p. 76). The concept of telepresence is related to the experience of flow, which is characterized by focused attention (Wedel et al. 2020, p. 446). Similarly, telepresence describes the process in which the user fully concentrates on the VR stimuli and forgets the real world around him (Hollebeek et al. 2020, p. 8). To reach this mental state, the user must willingly suspend the knowledge that the perceived environment is unreal (Steuer 1992, pp. 88). Following research emphasizes telepresence as a core differentiator of VR and thus this psychological phenomenon receives enormous attention in research (Berg and Vance 2016, p. 2).

Telepresence is an individual- and context-dependent state of consciousness and thus involves a personal, an environmental, and a social dimension. First, personal presence refers to the feeling of the user to exist in the simulated world. Second, environmental presence is concerned with the interactivity of the virtual environment. Third, social presence deals with the presence and interaction with other subjects in the simulation (de Regt et al. 2021, p. 514).

First, this review considers personal presence. Telepresence does refer to the perception of a simulated environment mediated by both automatic and controlled mental processes. Many perceptual factors contribute to the 'sense of being' such as attention, engagement with sensory channels, past experience and knowledge with technology, and individual information

processing (Steuer 1992, p. 75). Given that telepresence is experienced by means of the underlying VR system, the characteristics of the technology directly affect user perception. Past research reveals that especially the vividness (also described as media richness (Klein 2003, p. 42)) of the VR experience contributes to the feeling of telepresence (Barnes 2016, p. 6; Orth et al. 2019, p. 202; Steuer 1992, p. 80). As discussed before vividness refers to a technology's ability to create a sensorially rich environment (Steuer 1992, p. 80). The provision of more information usually enhances the perception of telepresence (Wedel et al. 2020, p. 451). In line with these findings, past research reveals that immersive VR platforms are more suitable to induce the feeling of telepresence through perceptual inputs (Boyd and Koles 2019b, p. 592; Chen and Yao 2022, p. 525). As Riva et al. (2007, p. 45) points out, emotions and the feeling of presence are interrelated and thus telepresence is enhanced in emotional VR environments (Barnes 2016, p. 19). Beyond that, the VR design choices determine an environment's ability to evoke telepresence (Orth et al. 2019, p. 213). The ability to virtually touch objects in VR may be particularly useful in enhancing sensory experiences (Alzayat and Lee 2021, p. 349). Interestingly, Loureiro et al. (2021, p. 295) emphasize that the integration of calm music increases the feeling of 'being there'. Moreover, it is important to consider that VR resides in an individual's consciousness. There are large differences in individual stimulation preferences and physiological processing and responding to stimulation. Thus, the tendency to experience telepresence and the level of optimal stimulation vary across individuals (Luangrath et al. 2022, p. 3; Steuer 1992, p. 80).

Second, this paper examines the characteristics and the impact of interactivity. Past research reveals that next to vividness, interactivity is the second technical factor that contributes to the sense of telepresence (Cowan et al. 2021, p. 87; Steuer 1992, p. 80). Interactivity is defined as the "degree to which users of a medium can influence the form and content of the mediated environment" (Steuer 1992, p. 80). It allows users to interact in real-

time with objects and surroundings in virtual environments and can be seen as the extent and realism of VR actions (Barnes 2016, p. 6; Farah et al. 2019, p. 138). It can vary according to the range of possible actions available to the user, the speed of actions (e.g. real-time) and the nature of controls (e.g. tracking and mapping of user position and movements) (Barnes 2016, p. 6; Meissner et al. 2020, p. 220). The extent of interactivity determines the level of user control and the feeling of playfulness the user perceives when interacting with the virtual environment (Kang et al. 2020, p. 72). A key factor of interactivity is user control. It is defined as the user's ability to know that one is successfully using the virtual environment (Han et al. 2020, p. 312; Klein 2003, p. 44). The optimal level of control depends on the VR expertise of the user. Next to the individual's expertise and information processing capabilities, locus of control, desire for control and affective states are found to positively influence an individual's perceived amount of control (Klein 2003, p. 53). Interactivity is an important aspect of VR in the context of marketing, because this characteristic enables the VR user to "become a part of the persuasive process" (Ahn and Bailenson 2011, p. 93).

Third, this paper investigates the social dimension of telepresence. There may be several actors present in the virtual environment that affect the user's perception of telepresence. The experience of interaction and shared experience with others in the virtual world can result in an enhanced personal experience (de Regt et al. 2021, p. 516). This feeling of socialness has the potential to increase the user's sense of telepresence (Barnes 2016, p. 8; Steuer 1992, pp. 87-88). Past research reveals that the perception of socialness can improve task performance (skills) and engagement of users in VR (Hadi and Valenzuela 2020, p. 258). The concept of social presence deals with the ability of VR to facilitate social encounters and the experience of other users as telepresent. It is a multidimensional construct that encompasses co-presence (sense of being with other people in VR), psychological involvement (psychological factors of users and others (e.g. mood)) and behavioural engagement (reactions of users and others)

(Barnes 2016, p. 16). From the psychological perspective, research reveals that haptic feedback and technology enabled human touch are associated with proximity and psychological closeness and are thus effective in fostering social presence (Hadi and Valenzuela 2020, pp. 258-259; Wedel et al. 2020, p. 453). From a marketing perspective, social interaction may be beneficial, because it enables word-of-mouth communications (e.g. personal recommendations) and thus potentially exercise a positive influence on an individual's purchase behaviour (Barnes 2016, p. 15)

The concept of transportation is related to the experience of telepresence. While research on telepresence focuses on the psychological perception of VR through multiple sensory inputs, transportation describes the process of transferring the user's consciousness from the real world (departure) to the virtual environment (arrival). The VR content or narrative plays a crucial role in this process (Chen and Yao 2022, p. 525). High immersive systems that present content containing narrative structures may emotionally engage the user with the plot or characters and thereby stimulate the user's feeling of presence and identification (telepresence). This process is called narrative transportation (de Regt et al. 2021, p. 514; Meissner et al. 2020, p. 220). For transportation to happen the user must process the story, show empathy and detach him- or herself from the real world from a physiological point of view (Chen and Yao 2022, p. 530). VR content that enables the user to active story-doing, compared to passive story-telling, enhances the feeling of transportation (de Regt et al. 2021, p. 515).

#### **4. Recent Literature Findings on the Impact of VR on Customer Experience and Marketing Objectives along the Customer Journey**

##### ***4.1 Conceptual Review of VR Customer Experience and Journey***

The customer experience is typically characterized by a long decision process (Farah et al. 2019, p. 139). Therefore, Lemon and Verhoef (2016, p. 6) refer to it as “a customer’s journey with a firm over time [...] across multiple touch-points”. The customer journey (consumer’s purchase-related decision-making process) consists of three stages: pre-purchase, purchase and post-purchase stage (Farah et al. 2019, p. 138; Hollebeek et al. 2020, p. 4; Loureiro et al. 2021, p. 289). First, in the pre-purchase stage, the customer recognizes a need or desire, searches for potential products or services that may fulfill this need /desire and subsequently evaluates and compares the present alternatives. Second, in the purchase stage, the customer makes a choice, orders and pays. Lastly, in the post-purchase stage, the purchased product is used/consumed by the customer. Additionally, the customer may make a service request or ask for recovery (Farah et al. 2019, p. 139; Loureiro et al. 2021, p. 289). Customers’ motivations, goals, information and benefits may evolve along the customer journey and therefore marketers must adjust their marketing communication accordingly (Farah et al. 2019, p. 138).

The use of VR can help marketers achieve their marketing goals by facilitating customer experience and decision-making at each stage of the customer journey (Hollebeek et al. 2020, pp. 2-3; Wedel et al. 2020, p. 448). Hollebeek et al. (2020, p. 5) outline a VR customer journey as follows. Initially, customers become aware of marketing-based VR content and they may form a desire to interact with this content, because they want to understand it, experience it or socialize with others. During the VR-based interaction, customers may experience immersion, telepresence and potentially flow, which raises brand trust and value. After the interaction with the VR content is finished, the customer may feel the desire to experience the marketing-based

VR content again, potentially resulting in a new VR encounter (Hollebeek et al. 2020, p. 5). Farah et al. (2019, pp. 139-140) argue that the usage of VR may be particularly promising for the communication in the pre-purchase stage. However, the adoption and trial of VR tools also depends on the target group.

VR marketing aims at changing customers' cognitive, affective, behavioural, emotional, sensorial, and social attitude toward a firm's offering along the customer journey (Barnes 2016, pp. 4-5; Wedel et al. 2020, p. 445). According to Wedel et al. (2020, p. 447) this can be achieved by leveraging an interactive virtual environment, spatial and contextual displays, sensory feedback, and collaborative interaction. To measure and assess the effectiveness of VR marketing efforts, this paper must look at the attitudinal and behavioural outcomes at each stage of the customer journey (Wedel et al. 2020, p. 448).

#### ***4.2 Impact of Virtual Product/Brand Presentations in the Pre-Purchase Stage***

Past research shows that marketers can leverage VR applications in the pre-purchase stage. They can influence consumers' product awareness, learning and evaluation, build brand awareness and attitudes, and create and test new products in the market (de Regt et al. 2021, p. 513; Wedel et al. 2020, p. 451).

*4.2.1 Product learning.* VR product experience can be categorized between an indirect (traditional advertising) and a direct (product trial) product experience and can enhance product-related learning (Alzayat and Lee 2021, p. 349). Some studies argue that a stronger feeling of telepresence is associated with longer virtual store attachment (Loureiro et al. 2021, p. 295). However, as Chen and Yao (2022, p. 528) point out, the relationship between telepresence and cognitive performance may be curvilinear and depends on cognitive load. As consumers use more cognitive resources to examine the virtual environment, they can get distracted by details. By implementing sensory feedback and personalizing the VR environment, marketers can enhance consumer engagement and increase their engaged



timespan (Hollebeek et al. 2020, p. 18; Luangrath et al. 2022, p. 2). Furthermore, in trial situations, consumers typically investigate products by touch. The haptic sensation of simulating touch in VR may lead to enhanced product learning and reduces the user's feeling of uncertainty (Hadi and Valenzuela 2020, p. 257; Luangrath et al. 2022, p. 2). Past research highlights that consumers associated with higher levels of user control, perceive VR as less mediated (more real) and the resulting experience comes close to a real-life product trial. This facilitates product learning (Baek et al. 2020, p. 651; Klein 2003, p. 44). Additionally, consumers show more product learning when the transmitted information is referenced to the self in some way. Through the impression of familiarity cognitive resources are freed up (Ahn and Bailenson 2011, pp. 95, 104).

*4.2.2 Branding and brand attitudes.* A promising area of VR application is brand management. Several brands are currently experimenting with VR to elicit customer brand engagement, educate customers about their brand, and build positive brand attitudes (Barnes 2016, p. 7; de Regt et al. 2021, p. 513). Past research suggests that the application of the VR medium for this purpose is more effective and experiential than conventional promotional activities (Boyd and Koles 2019a, p. 443; Hollebeek et al. 2020, p. 2). Marketers can turn passive observation of brand promotion into active participation (de Regt et al. 2021, p. 513). Baek et al. (2020, pp. 654, 659) identify brand equity as an important driver of customer behaviour. Brand equity can be described as preference for a brand. Interestingly, Baek et al. (2020, p. 659) indicate that while intellectual and emotional experiences enhance brand equity, sensory and behavioural experiences are related to store visit intentions. There is evidence that the customers experience the presentation of branded content in VR as emotional and memorable. Emotional engaged customers enjoy the interaction through VR and tend to identify themselves with the presented brand. This may lead to a positive brand attitude (de Regt et al. 2021, p. 520; Hollebeek et al. 2020, pp. 19-20). Through its ability to immerse

customers in virtual environments, VR offers users the possibility to explore and evaluate simulated stores. This experiential value provided by VR can induce positive brand attitudes (Hilken et al. 2022, p. 499). Furthermore, telepresence and vividness of rendering are positively related to consumer brand attitudes (Baek et al. 2020, p. 651; Wedel et al. 2020, p. 451). The interactive nature of VR allows the consumer to exercise control and to become part of the persuasive process. This may increase brand interest and attitude (Ahn and Bailenson 2011, p. 93; Boyd and Koles 2019a, p. 443). When it comes to sensory input, research indicates that haptic cues play an important role in brand evaluation (Cowan et al. 2021, p. 94). Another important point to consider is that virtual environments may be able to mimic behaviour or appearance of customers. Research shows that this is particularly effective in building positive brand attitudes (Ahn and Bailenson 2011, p. 94). Apart from that, VR may enable customers to connect with other users and to share experiences. This social dimension can be amplified by creating a more gamified environment in which users perform tasks together. This social aspect is very powerful regarding brand building (Barnes 2016, p. 17; de Regt et al. 2021, p. 518).

*4.2.3 Product development and design.* VR is already actively used in several industries to simulate and test (new) products or packages, to facilitate collaboration and training processes, and to support managerial decision-making and innovation (Berg and Vance 2016, p. 1; Wedel et al. 2020, p. 451). Modern VR technology provides companies access to granular consumer data, enhancing their understanding of consumer decision-making. Thus, VR represents a valuable research and development (R&D) tool for companies that allows them to examine consumer preferences and behaviours in a controllable and flexible environment (Berg and Vance 2016, p. 1). Researchers refer to “the ability to directly collect data of consumers’ interactions with the simulation” and products as automated-tracking capability (Harz et al. 2021, p. 4). This form of R&D can be particularly valuable in the context of new

product testing, customer experience model testing, and (prelaunch) sales forecasts (Barnes 2016, p. 23; Harz et al. 2021, p. 4).

The launch of a new product is a costly and risky endeavour (Harz et al. 2021, p. 1). In this context, VR can help to make precise forecasts, improve investment decisions, and align production, marketing, and distribution plans (Harz et al. 2021, p. 2). Especially, when new products are expensive, highly innovative, and hard to understand, the deployment of VR can be highly beneficial (Harz et al. 2021, p. 20). The use of VR applications at an early stage of product development enables customers to influence the development process and designers and engineers to experience prototypes in novel ways. VR can be a meaningful tool to test and communicate design ideas in virtual environments that mimic real-world situations (Barnes 2016, p. 23; Berg and Vance 2016, pp. 8-9).

#### ***4.3 Impact of Virtual Product/Brand Presentations in the Purchase Stage***

VR is about to transform the way people shop. Leading retail companies such as Alibaba, eBay and IKEA invest huge amounts in the development of virtual retail spaces. Those virtual stores enable customers to purchase goods from everywhere at any time (Xi and Hamari 2021, p. 37). In this way, companies can create enhanced customer value by providing customers with more convenience in the purchase stage. VR also offers the opportunity to provide the customer with an optimized, personalized, and gamified environment that enhances the overall customer experience (Farah et al. 2019, p. 139; Wedel et al. 2020, p. 450). Beyond that, giving the customer the possibility to test and interact with goods in VR, may reduce procedural uncertainty and thus help customers to “go the last mile” (Hilken et al. 2022, p. 504). In this way, the deployment of VR can have a positive impact on customers’ purchase intentions, outcomes and willingness to spend (Barnes 2016, p. 15; Hilken et al. 2022, p. 504; Wedel et al. 2020, p. 450).

Purchase intentions describe the final stage of a customer's decision process, where he or she indicates his or her willingness to proceed to purchase (Kang et al. 2020, p. 73). Past research reveals that VR increases purchase intentions more than conventional marketing media (e.g. online shopping pages) (Boyd and Koles 2019a, p. 443; Hilken et al. 2022, pp. 501-502; Wedel et al. 2020, p. 450). Studies in the marketing domain point to the fact that virtual product presentations are very suitable to stimulate purchase intentions (Wedel et al. 2020, p. 452). The interactive nature of VR can elicit rich mental images of product use in the customer's mind and integrate him or her in the persuasive process. Therefore, interactivity and the related feelings of vividness and user control lead to higher purchase intentions of VR users (Ahn and Bailenson 2011, p. 93; Wedel et al. 2020, pp. 451, 453). Furthermore, immersion and telepresence are both associated with higher levels of purchase intentions (Wedel et al. 2020, pp. 447, 452). Further research shows that the feeling of socialness in VR leads to higher purchase intentions. This is due to trusting beliefs built on social interaction and the observation of other alike people using and liking particular products (Barnes 2016, p. 17). In contrast to these findings, research shows that a high level of product category knowledge reduces customer purchase intentions in VR, because the VR experience is not in line with the customer's preferred semantic processing style (Cowan et al. 2021, p. 93). When it comes to VR design, a gamified virtual environment is better able to elicit purchase intentions (Barnes 2016, p. 11). Additionally, the ability to virtually touch objects or products in VR can lead to psychological ownership, which can be described as the feeling that something 'is mine'. Customers experiencing psychological ownership of virtual products typically value those higher and show stronger purchase intentions (Luangrath et al. 2022, p. 3).

Past studies indicate that the use of VR has a positive impact on the willingness to pay of customers (Meissner et al. 2020, p. 219). For example, customers at furniture department stores with integrated VR solutions were found to have a 60% greater average order value than

other shoppers in non-VR stores (Meissner et al. 2020, p. 219). There is also evidence that customers in high-immersive VR environments are less price-sensitive (Meissner et al. 2020, p. 222). Haptic feedback and the ability for virtual touch are positively related to customer's willingness-to-pay. First, the customer perceives the VR environment as more tangible when receiving haptic feedback and this improves his or her task performance. Second, the ability to touch can induce the feeling of psychological ownership. This triggers a higher valuation of the product and thus results in a higher willingness-to-pay. In a retail context, customers were willing to pay 32.5% more for a product, when being able to touch it in VR (Alzayat and Lee 2021; Luangrath et al. 2022, pp. 3, 15-17; Meissner et al. 2020, p. 222; Wedel et al. 2020, pp. 446, 452-453).

#### ***4.4 Impact of Virtual Product/Brand Presentations in the Post-Purchase Stage***

Finally, VR applications have the potential to enhance post-purchase customer satisfaction and loyalty (Barnes 2016, p. 26; Boyd and Koles 2019a, p. 443; Wedel et al. 2020, p. 450).

Customer satisfaction results from the comparison of perceived product performance with customer expectations. If customers feel that their expectations of the product are not met, they may become dissatisfied. The use of VR can reduce the risk of becoming dissatisfied with a product. This is due to VR's ability to provide the customer with additional product information in the purchase process and the interactive nature of VR that allows him or her to understand and evaluate the product more accurately. This in general results in the formation of more appropriate product expectations and ultimately in higher customer satisfaction (Meissner et al. 2020, pp. 222, 226). Past consumer research also highlights that the feeling of telepresence and psychological ownership positively influences customer satisfaction. There are mixed findings regarding the impact of immersion on satisfaction (Boyd and Koles 2019a, p. 443; Meissner et al. 2020, p. 226; Wedel et al. 2020, pp. 447, 453).

VR customer experience affects customer choice satisfaction, which in turn has a positive impact on customer retention and loyalty (Meissner et al. 2020, p. 220). Immersion is found to mediate the effect of customer satisfaction on loyalty (Wedel et al. 2020, p. 453). Furthermore, social presence is positively related to customer loyalty, because of word-of-mouth recommendations, communal engagement and continued use (Barnes 2016, pp. 17-18; Boyd and Koles 2019a, p. 443). From a retailer's perspective, themed retailscapes (e.g. Nike or Lego flagship stores) and gamification can be used to build customer loyalty (Barnes 2016, p. 11; Hilken et al. 2022, p. 504).

## **5. Conclusion**

### ***5.1 Theoretical Contribution***

The aim of this seminar paper is to investigate the impact of VR features on user perceptions and behaviours as well as marketing success. Marketing scholars focus their research mostly on the exploration of user presence and the nature and characteristics of VR user experience. Researchers consider VR experience from the physical (immersion) as well as the psychological (telepresence) perspective. On the one hand, immersion leads users to immerse in virtual environments, block out the real world around them, and pay focused attention to virtual objects and events. The level of immersion provided by VR depends on the characteristics of the underlying VR system and its ability to deliver a vivid and interactive illusion of reality by engaging the user's perceptual senses. On the other hand, telepresence is an individual and context-dependent feeling of 'being present' and involves a personal, an environmental, and a social dimension. Research also shows that the customer experience is characterized by a long decision process and consists of a pre-purchase, a purchase, and a post-purchase stage. This paper finds evidence that VR can help marketers achieve their marketing

goals by facilitating customer experience and decision-making at each stage of the customer journey. However, remaining technological challenges and data privacy concerns must be resolved, so that marketers can exploit the full potential of VR in the future. In sum, the present paper offers meaningful answers to the research questions and provides insights into the current state of marketing and consumer research on VR.

### **5.2 *Managerial Implications***

The realism of VR solutions has significantly improved in recent years, providing customers with highly immersive and interactive simulations that give customers the feeling of being physically present in the simulated environment. VR can thus be considered a valuable marketing tool with applications ranging from product design, product testing, brand management, and promotion to virtual shopping. There is evidence that personalized and gamified environments are best suited to elicit favourable customer reactions. In the first place, companies can use VR to collect data on consumer behaviours and preferences in the virtual world. They can then leverage this knowledge through the help of data analytics to create personalized VR content. Such personalized content is likely to be more persuasive and requires less cognitive resources to process it. Moreover, users react more favourable to the reflection of the self. Thus, it is advisable to mimic some characteristics of the concerned customer in the VR content. Companies should also consider individual differences. It may make sense to focus initial VR-based marketing efforts on VR-ready consumers first. Lastly, this review reveals that the ability to virtually touch objects in VR enhances customer experience and facilitates psychological ownership and product valuation. Therefore, companies potentially profit from enabling customers to touch products in the virtual environment.

### **5.3 *Directions for Future Marketing and Consumer Research***

To conclude this review, this paper sheds light on research directions that have not received much attention yet, but that have the potential to advance existing marketing and consumer

literature on VR in a meaningful way. First, while many scholars focus on exploring the impact of VR features on customer experience in the pre-purchase and purchase stage, the post-purchase stage is hardly considered (Wedel et al. 2020, p. 456). Therefore, this paper calls for more research at this stage of the customer journey. Second, there is a need to explore how gamification and personalization can be used in the context of VR marketing. Personalized pricing and promotion could be valuable tools in the VR context. The influence of chatbots and avatars on VR experience could also provide meaningful insights (de Jong et al. 2021, p. 2; Wedel et al. 2020, p. 457). Third, future research should further investigate the role of individual differences on the VR customer experience. Besides differences in personality traits, differences in demographic, cultural and ethical background are all found to influence customer experience (Xi and Hamari 2021, p. 53). Lastly, while VR is expected to equally affect marketing in the B2B and B2C market, the B2C sector has received much more research attention in the past (Boyd and Koles 2019a, p. 443). It is therefore advisable to increase research efforts in the B2B field.



**Tables**

**Table 1: 2x2 VR Archetypes Matrix**

	<b>AUTONOMOUS VR</b> (VR hardware)	<b>PROGRAMMATIC VR</b> (VR software)
<b>VR-CENTRIC VR</b> (Center on VR functionality)	<b>Autonomous VR-centric VR</b> (e.g. <i>Microsoft's HoloLens</i> )	<b>Programmatic VR-centric VR</b> (e.g. VR social media/apps, such as <i>Orbulus, Jaunt VR, vTime</i> )
<b>NON-VR CENTRIC VR</b> (VR functionality exists alongside the device's other major functions)	<b>Autonomous non-VR centric VR</b> (e.g. service robots/desktop computers used in marketing-based VR applications)	<b>Programmatic non-VR centric VR</b> (e.g. <i>Facebook's Virtual Selfie Stick</i> )

Source: Hollebeek et al. (2020, p. 35)

### Appendix A: Literature Review Table

Author/s (Year) (Journal)	Topic	Research Focus	Theoretical Background	Sample	Method/Analysis	Main Findings
Ahn and Bailenson (2011), ( <i>Journal of Advertising</i> )	Self-endorsing	Effect of self-endorsing as advertising strategy in virtual environments Comparison of influence of self-endorsing compared with other-endorsing within low- and high-immersive virtual environments	Theoretical framework of self-referencing	Study 1 & 2: N=80 Study 3: N= 70	DV= Brand attitude, purchase intention, brand association, purpose, manipulation check, brand familiarity, self-referencing	Self-endorsing involves incorporating the consumer within an advertisement, depicting the self-endorsing a brand or product Self-endorsing is a novel advertising strategy made possible by the development of virtual environments Self-endorsing was found to result in higher brand attitude and purchase intention than other endorsing Interactivity as mechanism behind self-endorsing identified Evidence for self-reference as mediator found
Alzayat and Lee (2021), ( <i>Journal of Business Research</i> )	Virtual touch	Examination how virtual touch affects consumers' shopping experience (hedonic/ utilitarian) Determination what type of products are better suited for a virtual touch experience	Telepresence, utilitarian and hedonic shopping value and need for touch	Study 1: N=48 Study 2a: N=70 Study 2b: N=160	DV= Utilitarian/hedonic shopping value, extension and presentation of body, need for touch (autotelic and instrumental)	Consumer's ability to touch products is an essential component of one's retail shopping experience VR retail environment (vs. an online retail website) positively impacts hedonic shopping value VR retail environment leads to consumers perceiving certain products as an extension of the body as opposed to perceiving it as a presentation of the body VR retail environment more suitable for products that are perceived as an extension of the body (e.g. tools) rather than as a presentation of the body (e.g. clothes) Need for touch and telepresence found as mediators
Baek et al. (2020), ( <i>International Journal of Retail &amp; Distribution Management</i> )	Virtual tours	Examination of the distinctive effects of a virtual tour on brand experience in a retail context	Brand experience and brand equity	N=240	Virtual tour stimuli created using 360-degree photos of real stores. Participants explored the store virtually and then completed an online survey  DV= Brand equity, store visit intentions	The virtual tour can be a powerful branding tool in the online-dominant retailing era Retailers can employ a virtual tour not only to increase brand equity but also to cultivate consumers' intentions to visit their stores Results showed that store brand experiences significantly affected consumers and the four brand experience dimensions exerted differentiated effects. Sensory and behavioural experiences directly increased intentions to visit the store, whereas intellectual and emotional experiences promoted visit intentions via enhanced brand equity

Barnes (2016), ( <i>Implications and Potential</i> )	VR in marketing	Provision of a framework for understanding the impact of virtual reality on consumers  Illustration of the value of VR in marketing	Telepresence, immersion and interactivity		Theoretical	Virtual reality affords marketers the opportunity to provide potential consumers with the most realistic experience of a product, service, or place yet without necessary physical co-location This provides an advanced, rich, and immersive medium that is able to deliver distinctive, high-impact and memorable messages, and engage audiences and potential consumers The cost of VR is declining, and it is becoming more accessible. VR headsets are a low-cost product, which will boost adoption VR technology is developing very quickly and there are a mixture of technological platforms and standards
Berg and Vance (2016), ( <i>Virtual Reality</i> )	VR in product design	Description of the current state of the art of virtual reality as it is used as a decision-making tool in product design, particularly in engineering-focused businesses	Telepresence and VR experience definition Brooks (1999)	Survey: N=18 Interviews: N=62	Survey of industry was conducted over several months. Additionally, data on virtual reality applications was gathered across a variety of industries through a series of on-site visits.	VR is being used to support stronger understanding through immersive experiences VR is actively being used in a number of industries to support decision making and enable innovation While not suited for every problem, this research shows VR's strengths at investigating a variety of questions pertaining to visibility, ergonomics, packaging, aesthetic quality, abstract data visualization, storytelling, and across discipline communication
Boyd and Koles (2019a), ( <i>Journal of Business Research</i> )	VR in marketing	Overview of the evolution of virtual reality concept within marketing domain Provision of a preliminary VR definition Review of important contributions in this field	VR definition Steuer (1992) and VR experience definition Brooks (1999)		Theoretical	The research focuses marketers on considering VR implementation from a technological, human, and behavioural perspective and explore how these VR-related factors can potentially impact customer experience associated with the VR technology Behaviour should be driven by the purpose of creating an enjoyable experience for consumers, because enjoyment is a key factor driving consumer adoption of VR and VR's subsequent impact on purchase intentions
Boyd and Koles (2019b), ( <i>Journal of Business Research</i> )	VR in B2B marketing	Description of the impact of VR on B2B buyer perceptions of value-in-use during the post-purchase stage of the buyer's purchase journey	Telepresence and immersion		Theoretical	Post-purchase value in B2B exchange relationships is a complicated process based on perceptions of coordination and asset management effectiveness VR can enhance performance of tasks including purchasing, using, and maintaining the solution a supplier provides to its buyers Existence of moderating impact of several aspects of buyer-supplier relationships, including knowledge complexity, social complexity and task complexity, on virtual reality's contribution to value-in-use perceptions
Chen and Yao (2022), ( <i>Psychology &amp; Marketing</i> )	Telepresence and transportation	Differentiation of the effect of telepresence induced VR from the effect of narrative transportation Investigation of interactions between telepresence and transportation	Telepresence, transportation, and immersion	Study 1: N=118 Study 2: N=262	Real estate property tour in virtual reality (VR; high immersion) or as a 360° video (low immersion) in a research lab. The tour was accompanied by a voiceover presenting descriptive information about the apartment (descriptive evidence) or a narrative-based introduction (narrative evidence). Study 2	Enhanced telepresence under the VR viewing condition negatively impacted users' memory of the property; this effect was particularly pronounced with the narrative voiceover Narrative-induced transportation strengthened attitudinal outcomes, and enhanced telepresence boosted this effect

					<p>replicated key findings from Study 1 in an online experiment with a larger and more diverse sample</p> <p>DV: memory performance, attitudes, and behavioural intentions</p>	<p>The highly immersive media experience combined with deep transportation into the narrative can strengthen viewers' positive attitude towards the overall experience but hinder their ability to remember the details of the content</p>
<p>Cowan et al. (2021), (<i>Journal of Business Research</i>)</p>	<p>VR impact on branding</p>	<p>Investigation of effect of presence induced by media (360-VR versus video) on heightened attitudes and purchase intentions Examination of role and effect of consumer's knowledge of the product category as well as haptic information</p>	<p>Flow, immersion and telepresence</p>	<p>Study 1: N=128 Study 2: N=160 Study 3: N=228 Study 4: N=185</p>	<p>The objectives of the conducted studies were, first, to investigate how 360-VR' alters attitudes and intentions in and outside the physical retail location. Second, examine product knowledge as a moderator. Third, evaluate touch as a boundary condition. Finally, mental imagery is tested as a mediator</p>	<p>Positive brand evaluations and increased purchase intentions following a 360-VR online retail experience Dependence on individual product category knowledge, presence induced in the experience, and haptic input found When consumers have high product knowledge, 360-VR decreases consumer responses toward the brand. Alliteratively, when consumers have low product knowledge 360-VR enhances consumer responses toward the brand Introduction of haptic instructions attenuates the unilateral negative effect of product knowledge Mental imagery underpins these relationships</p>
<p>de Jong et al. (2021), (<i>Industrial Marketing Management</i>)</p>	<p>Trends in B2B marketing</p>	<p>Identification and discussion of the impact of B2B services trends: gamification, personalization, mixed reality, data visualization, and privacy</p>	<p>Data privacy concept Udo (2001)</p>		<p>Theoretical</p>	<p>The safety of information and its privacy is a matter of significant concern to many organizations as data breach instances have significantly increased One opportunity is to go beyond the regulatory or legal boundaries and develop insights into the psychological foundations of the privacy concept</p>
<p>de Regt et al. (2021), (<i>Journal of Business Research</i>)</p>	<p>VR experience</p>	<p>Guidance how marketers can strategically design VR experiences to create favourable customer perceptions, attitudes, and behaviours</p>	<p>Immersion, telepresence, and customer brand engagement dimensions: affective, behavioural, and artificially induced sensations</p>	<p>Study 1: N=27 Study 2: N=561</p>	<p>In Study 1 focus groups were formed to explore how social presence and narrative interaction promote customer brand engagement and its outcomes To validate the focus group findings and test the resulting hypotheses, an experimental study was designed and conducted that compare a 360-degree VR video ad with a standard video ad</p>	<p>As it offers immersive and interactive encounters, VR technology is a promising tool for managers to enhance attitudes and encourage positive behaviours towards their brands., evidenced by increasing and successful VR marketing applications The results indicate a direct positive correlation between higher levels of narrative and social interaction in branded VR experiences and customer brand engagement outcomes The findings show that customer brand engagement needs to pay attention to the sensory elements of these branded VR experiences, (i.e., physical, and artificially induced sensations)</p>
<p>Farah et al. (2019), (<i>Journal of Retailing and Consumer Services</i>)</p>	<p>VR customer experience</p>	<p>Investigation of the effects of the accelerating adoption of head-mounted devices by brands and consumers on retailers' in-store traffic Discussion how VR could complement the consumer experience across the customer journey</p>	<p>Immersion and telepresence</p>	<p>Experts: N=15 Consumer: N=24</p>	<p>A qualitative research design interviewing both experts and consumers was adopted</p> <p>DV= consumer experience, customer journey and physical retailing.</p>	<p>The findings show that there is an expectations' gap build-up through the usage of VR versus what could be the actual generic in-store experience This research shows that the VR technology presents considerable potentials not only within an in-store environment, but also across the overall consumer journey The findings indicate that VR effectiveness seems to reach its peak at the engagement stage only to drop steadily at the purchase stage, to finally stabilize at the last loyalty phase</p>

<p>Hadi and Valenzuela (2020), (<i>Journal of Consumer Research</i>)</p>	<p>Virtual touch</p>	<p>Examination of the psychological and behavioural implications of technology-mediated touch on consumers</p>	<p>Social presence</p>	<p>Study 1: N=123 Study 2: N=86</p>	<p>The purpose of study 1 was to provide initial evidence that the mere addition of haptic feedback to messages can improve performance on a related task. Participants were asked to partake in a physical challenge (taking as many steps as they could in a brief time span) while holding a mobile smartphone that received encouraging text messages Study 2 should replicate the effect of study 1 using an alternative haptic-deliver device (a smartwatch). Moreover, a third experimental condition (text messages accompanied by only haptic feedback and no auditory feedback) was added, allowing to determine whether the effects in the experimental condition in study 1 were being driven by the addition of haptic feedback specifically, or as a consequence of increased attention stemming from sensory activation in multiple modalities (auditory plus haptic)</p>	<p>Haptic alerts accompanying messages can improve consumer performance on related tasks and it is demonstrated that this effect is driven by an increased sense of social presence in what can otherwise feel like an impersonal technological exchange Results support a process based on the idea that consumers are especially likely to attribute social presence to exchanges that trigger their sense of touch, since touch represents both a spatial and psychologically proximal modality Brand managers can choose to add haptic feedback to communications, and this research would suggest that doing so might be an easy way to positively influence consumers' responses to the messages and improve attitudes toward the sender</p>
<p>Han et al. (2020), (<i>Journal of Business Research</i>)</p>	<p>VR Adoption</p>	<p>Investigation of flow-related psychological factors that facilitate consumers' adoption and use of VR technology</p>	<p>Flow, telepresence and technology acceptance model Davis (1989)</p>	<p>N=120</p>	<p>Data was collected by having participants use VR glasses in an actual VR supermarket that was created for this study After shopping, survey questionnaire was attained through the interview with the researcher</p>	<p>Factors that enhance consumer flow (i.e. telepresence, challenge, body ownership, and control) are positively associated with antecedent factors of technology acceptance (i.e. playfulness and usefulness), which are, in turn, associated with greater intentions to adopt and utilize VR technology in a consumer setting. Moderating role of technology readiness and time distortion on the relationship between telepresence and playfulness found</p>
<p>Harz et al. (2021), (<i>Journal of Marketing</i>)</p>	<p>VR Product Development</p>	<p>Examination how consumer durable goods producers can leverage virtual reality for new product development</p>	<p>Macro-flow models</p>	<p>Study 1: N=631 Study 2: N=210</p>	<p>Development of a prelaunch sales forecasting approach with two key features: virtual reality and an extended microflow model. To assess its effectiveness, the authors collect data from potential buyers of two real-world innovations Second, to understand the mechanisms of virtual reality, the authors conduct a controlled laboratory experiment.</p>	<p>The results reveal that the new approach yields highly accurate prelaunch forecasts across the two field studies: compared with the actual sales data tracked after the product launches The average mean absolute percentage error for the monthly sales is only 23% across both studies The findings reveal that virtual reality fosters behavioural consistency between participants' information search, preferences, and buying behaviour Virtual reality enhances participants' perceptions related to presence and vividness, but not their perceptions related to alternative theoretical perspectives</p>
<p>Hilken et al. (2017), (<i>Journal of the Academy of Marketing Science</i>)</p>	<p>VR impact on marketing goals</p>	<p>Investigation of the individual and combined impact of AR and VR on key marketing objectives Provision of evidence-based guidelines for leveraging AR and VR for experiential retailers within their online retailing strategy</p>	<p>Mental imagery</p>	<p>Study 1: N=296 Study 2: N=365 Study 3: N=353</p>	<p>Three studies were conducted to test the proposed hypotheses: In Study 1, it was tested whether AR, due to its greater product-focused imagery, is better suited for stimulating customer purchase intentions compared to VR In Study 2, it is investigated whether VR, due to its greater ambience-focused imagery, fosters more positive brand attitudes compared to AR</p>	<p>Both AR and VR have a discernible impact on customers' purchase intentions when compared to conventional marketing media (e.g., online menus, retailscape images) VR and AR outperform conventional marketing media in building positive brand attitudes. VR is better suited than AR in this respect, as it supports customers in generating more fluent mental imagery of the retailscape (vs. products) Letting customers first use AR to decide on what to buy, and then VR to envision the</p>

					In Study 3, the optimal order of deploying of AR and VR together to increase both purchase intentions and brand attitudes is assessed	consumption of these products in the retailscape, results in a positive impact on both purchase intentions and brand attitudes
Hoffman and Novak (1996), ( <i>Journal of Marketing</i> )	Construct of flow in mediated environments	Proposition of a structural model of consumer navigation behaviour in technology mediated environments that incorporates the notion of flow	Flow		Theoretical	Marketers must carefully consider the ways in which advertising and communication models can be adapted and reconstructed for the interactive, many-to-many medium Scholars must determine the variables that relate to a consumer's propensity to enter the flow state. Such information can be used to develop marketing efforts designed to maximize the chances of the consumer entering the flow state Because consumers vary in their ability to achieve flow, new bases for market segmentation are needed for marketing in hypermedia mediated environments
Hollebeek et al. (2020), ( <i>Journal of Retailing and Consumer Services</i> )	VR technology and customer journey	Definition of virtual reality through the customer journey Classification of VR archetypes, formats, and content features, followed Development of a conceptual framework and an associated set of propositions of VR Customer Journey	Immersion, vividness, telepresence, and customer experience/journey		Theoretical	By complementing or substituting other marketing tools, VR can thus nurture the customer's experience throughout their journey, thus offering major benefits to marketers Development of a 2x2 matrix that comprises four VR archetypes Construction of framework and an associated set of propositions that incorporate consumers' pre-, intra-, and post-VR experience
Kang et al. (2020), ( <i>Journal of Interactive Marketing</i> )	VR impact in purchase stage	Exploration how three interface features (features- interactivity, visual-spatial cues, and graphics quality) enhance playfulness and informativeness of shopping interface and further influences subsequent product evaluation and purchase intention.	Perceived informativeness, perceived playfulness and interactivity	N=218	T understand how interface features visual-spatial cues, graphics quality, and interactivity influence the perceived level of informativeness and playfulness, fictitious virtual shopping interfaces were created by operating each interface feature	Interactivity and visual-spatial cues significantly enhance perceived informativeness and playfulness; however, the role of graphics quality was found to be more critical for 2D displays than for 3D VR environment Informativeness and playfulness influence the purchase decision-making process in distinct ways. More specifically, a playful interface may enhance consumers' preference for hedonic product benefits (e.g., a stylish and attractive design), whereas informativeness is a more important explanatory variable for subsequent purchase intentions
Kim (2021), ( <i>Journal of Interactive Advertising</i> )	Metaverse	Explanation of the metaverse concept and the role of advertising in it.	Definition advertising Kerr and Richards (2020)		Theoretical	There is no clear consensus yet on how the metaverse should be defined or described because of its complexity Across the definitions, the common attributes of the metaverse appear to be the continuity (or persistence) of identity and objects, a shared environment, the use of avatars (or embodied self), synchronization, being three dimensional (or virtual), interoperability, and a user experience that is interactive, immersive, and social. A working definition of the metaverse can be that it is an interoperated persistent network of shared virtual environments where people can interact synchronously through their avatars with other agents and objects

<p>Klein (2003), (<i>Journal of Interactive Marketing</i>)</p>	<p>Effects of telepresence</p>	<p>The construct of telepresence, is used to examine the process by which media characteristics influence consumer responses</p>	<p>Immersion and telepresence</p>	<p>Study 1: N=140 Study 2: N=100</p>	<p>Through two experimental studies, the effect of two media characteristics— user control and media richness—on the creation of telepresence is examined and the impact of telepresence on consumer beliefs and attitudes toward the advertised product assessed</p>	<p>Results show that user control and media richness both contribute to creating a sense of telepresence Telepresence was found to have a significant and positive impact on persuasion, measured at the attribute level and at the product level Through telepresence, these media characteristics influence consumers' cognitive responses While it appears that the creation of telepresence is sensitive to the operationalizations of media richness, it is also apparent that creating a level of telepresence sufficient to have a meaningful effect on product beliefs and attitudes is not difficult Marketers must understand the optimal levels of user control and media richness that not only enable a virtual experience, but also minimize distraction and potential information overload</p>
<p>Laurell et al. (2019), (<i>Journal of Business Research</i>)</p>	<p>VR adoption</p>	<p>Assessment how diffusion of VR technology is taking place Identification of potential barriers to increased adoption.</p>	<p>Diffusion research</p>	<p>N=6,044</p>	<p>Social media analytics used to collect a data set covering an empirical material of user-generated content concerning the market-leading VR headsets Oculus Rift and HTC Vive, and machine learning to identify critical barriers to adoption</p>	<p>There is a lack of sufficient technological performance of these headsets and that more applications are required for this technology to take off In contrast to this promising and exciting future for VR technology, current sales of headsets are, as previously stated, growing but from low levels To understand barriers to adoption of a new platform technology and its associated ecosystem, the value of a technology platform needs to be assessed against several dimensions: stand-alone value, network externalities' value and price The results indicate that the technology doesn't seem entirely ready at this point. Given exponential improvements in performance and availability of complementary goods, this might change in the future the possibility that this phenomenon will evolve positively in the coming years</p>
<p>Loureiro et al. (2021), (<i>Journal of Business Research</i>)</p>	<p>VR user experience</p>	<p>Extension of the Stimuli-Organism-Response framework by considering escapism as stimuli and incorporating vividness and telepresence as organism Examination of the role of calm versus upbeat music tempo in the background of virtual reality stores</p>	<p>Customer experience, escapism, and telepresence</p>	<p>N=200</p>	<p>An experimental study was conducted to analyze the differences between music tempo in-store under a VR environment</p>	<p>Escapism, which functions as experience, stimulates the consumers' cognitive and affective state that increase pleasure The consumers' sense of pleasure heightens the vividness and presence of the virtual reality store, which positively affects their intentions The link between presence and behavioural intention is stronger with calm music in the background. On the contrary, the link between arousal and pleasure is stronger when consumers listen to upbeat music in the virtual store</p>
<p>Luangrath et al. (2022), (<i>Journal of Marketing Research</i>)</p>	<p>Virtual touch</p>	<p>Examination of vicarious touch, or the observation of a hand in physical contact with a</p>	<p>Vicarious touch, body ownership and psychological ownership research</p>	<p>Study 1: N=4,535 Study 2: N=502</p>	<p>Across eight studies, the authors use images, GIFs, and VR to analyze the impact of vicarious touch on body ownership and psychological ownership</p>	<p>Vicarious touch affects consumers' psychological ownership and product valuation due to the active nature of product touch, which results in a felt sense of body ownership of the</p>

		product in a digital environment				virtual hand. This is termed the “vicarious haptic effect” The results show that vicarious touch can increase feelings of product ownership and subsequent product valuation Results demonstrate that it is not enough to show a hand in an advertisement; the hand must be touching a product The vicarious haptic effect is strongest for people who become highly stimulated by an immersive VR experience For marketing managers, there is great potential in devising systems that can simulate haptic experiences to create efficiencies in the pre-purchasing process
(Meissner et al. 2020), ( <i>Journal of Business Research</i> )	Impact of immersion in VR	Investigation how immersion affects consumer choice, comprising three key choice characteristics: variety-seeking, price-sensitivity, and satisfaction with the choice made	Immersion, interactivity, telepresence, and state dependence	N=257	Experiment conducted to test effects of immersion on consumer choice  DV= Variety Seeking, price-sensitivity and satisfaction with the choice made	There is evidence that consumers in high-immersive VR choose a larger variety of products and are less price-sensitive Choice satisfaction, did not increase in high-immersive VR
Orth et al. (2019), ( <i>Journal of Service Research</i> )	Antecedents of telepresence in VR	Examination how managers can use the visual design of virtual servicescapes to achieve a sense of telepresence	Telepresence and Kaplan and Kaplan’s framework on informational variables: Mystery, complexity, legibility and coherence	Study 1: N=128 Study 2: N=189 Study 3: N=128	Three studies using mixed methods and diverse samples used to test hypotheses Study 1, is a content analysis, which uses expert judges and a global pool of virtual servicescapes Study 2 is a commercial analysis Study 3 uses a consumer sample in an attempt to replicate findings from study 2	Study 1 provides initial evidence that informational variables impact telepresence Study 2 shows that telepresence mediates effects of mystery and complexity (sensorially richer variables) on consumer intentions to approach Study 3 replicates the mediating role of telepresence and shows that a person’s visual processing style moderates effects of mystery and complexity The effects are robust in the presence of an alternative process path through aesthetics and occur regardless of consumers’ familiarity with the servicescape, category knowledge, and involvement
Pizzi et al. (2020), ( <i>Journal of Business Research</i> )	VR user experience	Exploration of causal relationships through which the virtual store experience affects consumers’ perceptions and intentions toward the retailer’s brand	Telepresence and immersion	N=200	Experimental study manipulating the store environment (virtual vs. physical)  DV= Inattention blindness, individuals’ perceptions of social presence, shopping experience, change in value perceptions, word-of-mouth referral intention and patronage	Individuals exposed to a virtual-reality-based retail environment perceive higher levels of presence than those exposed to a more traditional, physical store environment. This positive effect does not depend on individuals’ technological self-efficacy perceptions Higher levels of presence positively affect the shopping experience, which then produces a positive change in value perceptions, which ultimately leads to higher patronage intentions and word-of-mouth referral Presence of inattention blindness found in the virtual environment Image transfer from the store environment to patronage intention holds even when individuals cannot correctly recall the store brand



<p>Steuer (1992), (<i>Journal of Communication</i>)</p>	<p>Telepresence concept of VR</p>	<p>Definition of VR in terms of human experience rather than technological hardware</p>	<p>VR Research</p>		<p>Theoretical</p>	<p>VR has been typically defined in terms of a particular collection of of a particular collection of technological hardware, including computers, head-mounted displays, headphones, and motion-sensing gloves. The focus of virtual reality is thus technological, rather than experiential; the locus of virtual reality is a collection of machines By employing the concept of telepresence, virtual reality can now be defined without reference to a particular hardware system: A VR is defined as a real or simulated environment in which a perceiver experiences telepresence Telepresence is defined as the experience of presence in an environment by means of a communication medium If virtual reality is defined in terms of telepresence, then its locus is the perceiver</p>
<p>Wedel et al. (2020), (<i>International Journal of Research in Marketing</i>)</p>	<p>VR customer experience</p>	<p>Review of VR/AR research in consumer marketing that centers around consumer experiences provided by VR/AR applications along the customer journey and their effectiveness Comprehensive overview of VR/AR applications in current practices Overview over insightful research areas in context of VR marketing</p>	<p>Immersion, telepresence and customer experience/journey</p>		<p>Theoretical</p>	<p>Large companies continue to make major investments in VR/AR for mass-market applications There is a steady growth in marketing and consumer research on VR Development of a conceptual framework for consumer marketing research on VR. This framework recognizes immersion, presence, attention, consumer experience and the effectiveness of VR applications along the customer journey (pre-purchase, purchase and post-purchase stage)</p>
<p>Xi and Hamari (2021), (<i>Journal of Business Research</i>)</p>	<p>VR in shopping context</p>	<p>Assessment of the effects of VR and related stimuli on consumer psychology and behavior in the context of shopping</p>		<p>N= 72</p>	<p>This study systematically reviewed a body research papers that investigated the application of VR in shopping  DV= Covered research methods, theories, investigated output and input devices, tracking technologies, products and simulated environments, antecedents and consequences</p>	<p>Future research should have a broader and more comprehensive and abstract conceptual understanding of what VR is VR does not per se substitute reality as it exists in objective reality. VR technologies surrounding the perceptual experience include e.g., visual, aural, olfactory, tactile, movement and taste experiences created by different multi-modalities One of the most promising application areas of VR in a business context is considered to be shopping and retail</p>

### Appendix B: Comparative Literature Table

Citation	Virtual Reality				VR User Experience			Impact of Virtual Product and Brand Presentations					
	Technology	Virtual Worlds	Marketing Concept	Challenges/ Adoption	Information Processing	Immersion & Vividness	(Tele-) Presence	Customer Experience	Product Learning	Branding	Product Design	Purchase/ Shopping	Post-Purchase
<i>This study</i>	X	X	X	X	X	X	X	X	X	X	X	X	X
Ahn and Bailenson (2011)						X	X		X	X		X	
Alzayat and Lee (2021)	X						X		X			X	
Baek et al. (2020)									X	X			
Bainbridge (2007)		X											
Barnes (2016)				X		X	X	X		X	X	X	X
Berg and Vance (2016)	X		X	X	X		X				X		
Boyd and Koles (2019a)			X	X		X				X		X	X
Boyd and Koles (2019b)			X			X	X						
Brooks (1999)			X										
Chen and Yao (2022)		X				X	X		X				
Cowan et al. (2021)					X	X	X			X		X	
Davis et al. (1989)				X									
de Jong et al. (2021)				X									
de Regt et al. (2021)						X	X			X			

(Continues)

Citation	Virtual Reality				VR User Experience			Impact of Virtual Product and Brand Presentations					
	Technology	Virtual Worlds	Marketing Concept	Challenges/ Adoption	Information Processing	Immersion & Vividness	(Tele-) Presence	Customer Experience	Product Learning	Branding	Product Design	Purchase/ Shopping	Post-Purchase
Farah et al. (2019)	X		X			X	X	X				X	
Hadi and Valenzuela (2020)							X		X				
Han et al. (2020)				X	X		X						
Harz et al. (2021)			X			X					X		
Hilken et al. (2017)										X		X	X
Hoffman and Novak (1996)					X								
Hollebeek et al. (2020)	X	X				X	X	X	X	X			
Kang et al. (2020)	X		X				X					X	
Kannan (2020)				X									
Kim (2021)		X											
Klein (2003)						X	X		X				
Laurell et al. (2019)	X			X									
Lemon and Verhoef (2016)								X					
Loureiro et al. (2021)		X		X	X	X	X	X	X				
Luangrath et al. (2022)							X		X			X	
Meissner et al. (2020)			X	X		X	X					X	X
Orth et al. (2019)							X						

(Continues)

Citation	Virtual Reality				VR User Experience			Impact of Virtual Product and Brand Presentations					
	Technology	Virtual Worlds	Marketing Concept	Challenges/ Adoption	Information Processing	Immersion & Vividness	(Tele-) Presence	Customer Experience	Product Learning	Branding	Product Design	Purchase/ Shopping	Post-Purchase
Pizzi et al. (2020)		X				X	X						
Riva et al. (2007)							X						
Schroeder (2008)			X										
Slater and Wilbur (1997)						X							
Steuer (1992)			X	X	X	X	X						
Sutherland (1970)			X										
Udo (2001)				X									
Wedel et al. (2020)	X			X		X	X	X		X	X	X	X
Xi and Hamari (2021)	X											X	

*An “X” indicates that the study addresses a respective topic.*

## References

- Ahn, Sun Joo and Jeremy N. Bailenson (2011), "Self-endorsing versus other-endorsing in virtual environments," *Journal of Advertising*, 40 (2), 93-106.
- Alzayat, Ayman and Seung Hwan Mark Lee (2021), "Virtual products as an extension of my body: Exploring hedonic and utilitarian shopping value in a virtual reality retail environment," *Journal of Business Research*, 130, 348-63.
- Baek, Eunsoo, Ho Jung Choo, Xiaoyong Wei, and So-Yeon Yoon (2020), "Understanding the virtual tours of retail stores: how can store brand experience promote visit intentions?," *International Journal of Retail & Distribution Management*, 48 (7), 649-66.
- Bainbridge, William Sims (2007), "The scientific research potential of virtual worlds," *Science*, 317 (5837), 472-76.
- Barnes, Stuart (2016), "Understanding virtual reality in marketing: Nature, implications and potential," *Implications and Potential (November 3, 2016)*.
- Berg, Leif P. and Judy M. Vance (2016), "Industry use of virtual reality in product design and manufacturing: a survey," *Virtual Reality*, 21 (1), 1-17.
- Boyd, D. Eric and Bernadett Koles (2019a), "An introduction to the special Issue "Virtual Reality in Marketing": Definition, theory and practice," *Journal of Business Research*, 100, 441-44.

---- (2019b), "Virtual reality and its impact on B2B marketing: A value-in-use perspective," *Journal of Business Research*, 100, 590-98.

Brooks, Frederick P. (1999), "What's real about virtual reality?," *IEEE Computer graphics and applications*, 19 (6), 16-27.

Chen, Chen and Mike Z. Yao (2022), "Strategic use of immersive media and narrative message in virtual marketing: Understanding the roles of telepresence and transportation," *Psychology & Marketing*, 39 (3), 524-42.

Cowan, Kirsten, N. Spielmann, E. Horn, and C. Griffart (2021), "Perception is reality ... How digital retail environments influence brand perceptions through presence," *Journal of Business Research*, 123, 86-96.

Davis, Fred D., Richard P. Bagozzi, and Paul R. Warshaw (1989), "User acceptance of computer technology: A comparison of two theoretical models," *Management science*, 35 (8), 982-1003.

de Jong, A., K. de Ruyter, D. I. Keeling, A. Polyakova, and T. Ringberg (2021), "Key trends in business-to-business services marketing strategies: Developing a practice-based research agenda," *Industrial Marketing Management*, 93, 1-9.

de Regt, Anouk, Kirk Plangger, and Stuart J. Barnes (2021), "Virtual reality marketing and customer advocacy: Transforming experiences from story-telling to story-doing," *Journal of Business Research*, 136, 513-22.

Farah, Maya F., Zahy B. Ramadan, and Dana H. Harb (2019), "The examination of virtual reality at the intersection of consumer experience, shopping journey and physical retailing," *Journal of Retailing and Consumer Services*, 48, 136-43.

Hadi, Rhonda and Ana Valenzuela (2020), "Good vibrations: Consumer responses to technology-mediated haptic feedback," *Journal of Consumer Research*, 47 (2), 256-71.

Han, S. L., M. An, J. J. Han, and J. Lee (2020), "Telepresence, time distortion, and consumer traits of virtual reality shopping," *Journal of Business Research*, 118, 311-20.

Harz, Nathalie, Sebastian Hohenberg, and Christian Homburg (2021), "Virtual reality in new product development: Insights from pre-launch sales forecasting for durables," *Journal of Marketing*, 1-22.

Hilken, Tim, Mathew Chylinski, Debbie I. Keeling, Jonas Heller, Ko Ruyter, and Dominik Mahr (2022), "How to strategically choose or combine augmented and virtual reality for improved online experiential retailing," *Psychology & Marketing*, 39 (3), 495-507.

Hilken, Tim, Ko De Ruyter, Mathew Chylinski, Dominik Mahr, and Debbie I. Keeling (2017), "Augmenting the eye of the beholder: exploring the strategic potential of augmented reality to

enhance online service experiences," *Journal of the Academy of Marketing Science*, 45 (6), 884-905.

Hoffman, Donna L. and Thomas P. Novak (1996), "Marketing in hypermedia computer-mediated environments: Conceptual foundations," *Journal of Marketing*, 60 (3), 50-68.

Hollebeck, Linda D., Moira K. Clark, Tor W. Andreassen, Valdimar Sigurdsson, and Dale Smith (2020), "Virtual reality through the customer journey: Framework and propositions," *Journal of Retailing and Consumer Services*, 55, 1-37.

Kang, Hyo J., Jung-hye Shin, and Kevin Ponto (2020), "How 3D Virtual Reality stores can shape consumer purchase decisions: The roles of informativeness and playfulness," *Journal of Interactive Marketing*, 49, 70-85.

Kannan, P. K. (2020), "Introduction to the special section: Research for the new normaly," *International Journal of Research in Marketing*, 37 (3), 441-42.

Kim, Jooyoung (2021), "Advertising in the Metaverse: Research agenda," *Journal of Interactive Advertising*, 21 (3), 141-44.

Klein, Lisa R. (2003), "Creating virtual product experiences: The role of telepresence," *Journal of Interactive Marketing*, 17 (1), 41-55.



Laurell, Christofer, C. Sandstrom, A. Berthold, and D. Larsson (2019), "Exploring barriers to adoption of virtual reality through social media analytics and machine learning - An assessment of technology, network, price and trialability," *Journal of Business Research*, 100, 469-74.

Lemon, Katherine N. and Peter C. Verhoef (2016), "Understanding customer experience throughout the customer journey," *Journal of Marketing*, 80 (6), 69-96.

Loureiro, Sandra M. C., João Guerreiro, and Arnold Japutra (2021), "How escapism leads to behavioral intention in a virtual reality store with background music?," *Journal of Business Research*, 134, 288-300.

Luangrath, Andrea Webb, Joann Peck, William Hedgcock, and Yixiang Xu (2022), "Observing product touch: The vicarious haptic effect in digital marketing and virtual reality," *Journal of Marketing Research*, 59 (2), 306-26.

Meissner, Martin, J. Pfeiffer, C. Peukert, H. Dietrich, and T. Pfeiffer (2020), "How virtual reality affects consumer choice," *Journal of Business Research*, 117, 219-31.

Orth, Ulrich R., Larry Lockshin, Nathalie Spielmann, and Mirjam Holm (2019), "Design antecedents of telepresence in virtual service environments," *Journal of Service Research*, 22 (2), 202-18.

Pizzi, Gabriele, Virginia Vannucci, and Gaetano Aiello (2020), "Branding in the time of virtual reality: Are virtual store brand perceptions real?," *Journal of Business Research*, 119, 502-10.

Riva, Giuseppe, Fabrizia Mantovani, Claret Samantha Capideville, Alessandra Preziosa, Francesca Morganti, Daniela Villani, Andrea Gaggioli, Cristina Botella, and Mariano Alcañiz (2007), "Affective interactions using virtual reality: the link between presence and emotions," *Cyberpsychology & behavior*, 10 (1), 45-56.

Schroeder, Ralph (2008), "Defining virtual worlds and virtual environments," *Journal For Virtual Worlds Research*, 1 (1).

Slater, Mel and Sylvia Wilbur (1997), "A framework for immersive virtual environments (FIVE): Speculations on the role of presence in virtual environments," *Presence: Teleoperators & Virtual Environments*, 6 (6), 603-16.

Steuer, Jonathan (1992), "Defining virtual reality: Dimensions determining telepresence," *Journal of Communication*, 42 (4), 73-93.

Sutherland, Ivan E. (1970), "Computer displays," *Scientific American*, 222 (6), 56-81.

Udo, Godwin J. (2001), "Privacy and security concerns as major barriers for e-commerce: a survey study," *Information management & computer security*.

Wedel, Michel, Enrique Bigne, and Jie Zhang (2020), "Virtual and augmented reality: Advancing research in consumer marketing," *International Journal of Research in Marketing*, 37 (3), 443-65.

Xi, Nannan N. and Juho Hamari (2021), "Shopping in virtual reality: A literature review and future agenda," *Journal of Business Research*, 134, 37-58.

**Affidavit**

“I hereby declare that I have developed and written the enclosed master seminar thesis entirely on my own and have not used outside sources without declaration in the text. Any concepts or quotations attributable to outside sources are clearly cited as such. This master seminar thesis has not been submitted in the same or substantially similar version, not even in part, to any other authority for grading and has not been published elsewhere. I am aware of the fact that a misstatement may have serious legal consequences.”

Mannheim, Date