

Association for Information Systems

AIS Electronic Library (AISeL)

ECIS 2024 Proceedings

European Conference on Information Systems
(ECIS)

June 2024

Customer Satisfaction in Social VR Commerce: A Qualitative Perspective

Matthias Trier

Paderborn University, trier@upb.de

Annika Steiger

Paderborn University, steigera@mail.uni-paderborn.de

Yakup Güzel

Paderborn University, yakup@mail.uni-paderborn.de

Follow this and additional works at: <https://aisel.aisnet.org/ecis2024>

Recommended Citation

Trier, Matthias; Steiger, Annika; and Güzel, Yakup, "Customer Satisfaction in Social VR Commerce: A Qualitative Perspective" (2024). *ECIS 2024 Proceedings*. 3.

https://aisel.aisnet.org/ecis2024/track19_hci/track19_hci/3

This material is brought to you by the European Conference on Information Systems (ECIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ECIS 2024 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

CUSTOMER SATISFACTION IN SOCIAL VR COMMERCE: A QUALITATIVE PERSPECTIVE

Short Paper

Matthias Trier, Paderborn University, Paderborn, Germany, trier@upb.de

Annika Steiger, Paderborn University, Paderborn, Germany, annika-steiger@gmx.de

Yakup Guezel, Paderborn University, Paderborn, Germany, mail@yguezel.de

Abstract

Affordable VR technologies and platforms increasingly enable easy access to virtual social interactions for private persons. VR also offers innovative commercial opportunities, such as interactions between customers and organizations. As an interesting extension to conventional sales channels, this development results in the question of how to attain and optimize for customer satisfaction in VR-based social interactions. In this article, we report a first empirical analysis of relevant influence factors on customer satisfaction using the scenario of a shopping-related interaction between a sales avatar and a customer in a self-developed social VR commerce setting. Grounded in relevant theories of Social VR and customer satisfaction, we adopt a qualitative approach based on the focused interview method to assess customer perceptions on a broader range of influence factors. We contribute an empirically supported research framework of relevant influence factors on customer satisfaction in Social VR commerce settings and outline resulting research opportunities.

Keywords: Social Virtual Reality, VR Shopping, Customer Satisfaction, User Perception.

1 VR Commerce – a Possible Future

Due to the increasing availability of affordable virtual reality (VR) hardware, organizations and private users can increasingly use VR without large investments or technical experience (Jerald, 2016). Studies predict that the VR market will slowly increase to a multibillion-dollar business (Alsop, 2022). From the perspective of companies this poses the question how to utilize VR in business strategies. In particular, the recent advance to social VR as an enabler for virtual social interaction between users - and therefore prospectively also between customers and organizations - suggests an important untapped potential. It is anticipated to bring about new means to engage with customers and to attain customer satisfaction (Berweger, 2020). In contrast to existing e-commerce channels, companies could benefit from rich and multimodal social interaction opportunities in VR and present immersive spatial customer experiences similar to retail shops. For example, organizations may offer immersive virtual consultation in impressive virtual show rooms, where customer avatars can engage with virtual shopping assistants in real-time communication to explore and ask questions about products or services.

Previous research studied how the size of the product range in a virtual shop influences customer satisfaction of users (Pizzi et al., 2019). Lee and Chung (2008) find that customer satisfaction in a virtual shopping mall was higher than in a real shopping mall, but the authors do not examine the influence factors in more detail. A better understanding of how a rich commerce encounter should be designed and performed in modern VR is still needed. In this article, we address this gap and examine the following research question: *What are the influence factors on customer satisfaction in a virtual social interaction in a VR-commerce context, in which a customer consults with an avatar-based sales person?*

We will now first assemble relevant theoretical concepts into a comprehensive research model. We then adopt the focused interview method (Merton, 2008) as a qualitative method to study customers' experiences of a self-developed VR experience. This form of inquiry has been particularly developed for studying exposure to new information and material and is thus very suitable for investigating the innovative VR commerce experience from a user perspective. We finally summarize our findings in the discussion and outline how these results – as research in progress – will guide further research.

2 Relevant Influences on Customer Satisfaction in VR

A VR-based shopping encounter can be conceptualized as a social interaction between persons who are mediated and represented by their avatars in a virtual environment. This context implies two conceptual levels that may influence the perception of customer experience. The first level is the system layer providing the *technical VR environment* that mediates the interaction. Here, a VR system needs to offer an immersive environment with a familiar three-dimensional scene, representations of actors and opportunities to interact. Within this contextual setting, the user and the sales person *enact* a social engagement episode, constituting a second conceptual level of *virtual social interaction*. For the relationships between customers and sales staff we can draw on established models of customer satisfaction research such as PROSAT (Rapp, 1995) or SERVQUAL (Parasuraman et al., 1988). Due to the page restriction, we now provide a very brief overview about these influence factors.

2.1 The system level of the VR environment

A *virtual world* is an imaginary space, often manifested through a medium, with objects in space as well as the rules and relationships governing these objects (Sherman and Craig, 2003). When we view such a world with objects and interactions interactively and immersively, we experience virtual reality. It has been defined as a computer-generated digital environment that can be experienced and interacted with as if that environment were real (Jerald, 2016). The objects in this virtual world can represent actors. These characters can be computer-controlled *agents* (Bailenson et al., 2008). They can also be *avatars*, a virtual representation of real users controlled by them in real-time (Jerald, 2016). The social interaction and exchange in a virtual environment is called *social VR*, which can very closely resemble real face-to-face communication (Freeman and Maloney, 2020). Similar to other social media platforms, in which different design approaches and affordances enable ways of social interaction, social VR is also depending on the creators' design decisions and affords different aspects of sociality as well as a multitude of virtual social interaction practices (McVeigh-Schultz et al. 2018). We adopt the related term *socio-spatial setting* with a narrower focus on the perceivable virtual *place* that affords the social interaction in VR. Place, as a space endowed with social meaning, has been conceptualized for the context of collaborative systems by Harrison and Dourish (1996). The place as a socio-spatial setting is highly relevant for customer perceptions, as social interaction is more likely to happen, if the virtual environment reminds of a familiar physical place such as a Café (McVeigh-Schultz et al., 2019).

Immersion, as another important influence on users, is defined as the objective degree to which a VR system and its applications project stimuli on the sensory receptors of users in a way that is extensive, matching, surrounding, vivid, interactive, and plot informing (Jerald, 2016; Slater and Wilbur, 1997). A key objective of VR is that users feel *present* in the virtual environment and do not notice the technology but the objects, events and actors presented. Definitions typically consider *presence* as an inner psychological state and the perception of being there while blending out supporting technology, which indicates the close link to the concept of immersion (Jerald, 2016). As stimuli in VR are typically just projected to human receptors, the perceived presence is not like in reality and is thus referred to as the *illusion of presence*. The illusion of social communication is also referred to as *social presence*. As we want to foreground how the system enables and affords social presence, we draw on Short et al. (1976), who focusses on the medium, defining social presence as the degree in which a medium conveys the salience, interactivity, immediacy and richness of others and the sense of being together. The perception of being together is dependent of the technologically mediated representation of the interactants and the mutual perception of each other in a supportive surrounding VR environment (Biocca et al., 2003). If

the illusion is so compelling that it is perceived as social interaction at a visited location (Jerald, 2016), it is likely to positively influence social interaction and customer satisfaction. Finally, communication mediated through social VR offers a very high and for users almost effortless *media richness*, the medium's ability to handle multiple information cues simultaneously (e.g. visual, auditive and spatial), to facilitate rapid feedback (e.g. immediate body reactions), to establish a personal focus (e.g. through body language, triggerable face mimics or voice modulation) and to utilize natural language (Daft et al., 1987). Rich interactions facilitate the complex information exchange as users' uncertainty can be reduced in VR commerce settings, positively influencing customer satisfaction.

2.2 The levels of enacted social interaction and customer satisfaction

Next to the media view, social presence is also seen as being conveyed in ongoing social interaction, resulting in emergent perceptions during interdependent user interactions (Schultze and Brooks, 2019). In our context, this aspect reflects in more specific factors of a customer-seller interaction. Here, we can draw on the very mature research on customer satisfaction and the established standard theories such as PROSAT (Rapp, 1995) and SERVQUAL (Parasuraman et al., 1988). Both consider customer satisfaction as dependent on a variety of social interaction factors. We will not provide yet another lengthy introduction into these mature models but only briefly point out the influence factors that we consider important for our research. PROSAT considers five dimensions of service quality which are evaluated to determine customer satisfaction, such as technical product quality, service quality (incl. sub-elements such as responsiveness, assurance), quality of the personal relationship (incl. reliability, communication, conflict behaviour), reputation quality and price perception. The alternative SERVQUAL model proposes the factors reliability, responsiveness/friendliness, assurance/competence, or tangibles (i.e. the surrounding material context). Researchers argue that these general models need to be adapted to particular contexts (Schneider and Kornmeier, 2006:35), e.g., studies with a focus on online customer satisfaction note that information quality is a relevant additional influence factor (Hila Ludin and Cheng, 2014:464). We draw on these partially overlapping models and adopt a smaller set of relevant factors. This results in considering *customer orientation* (synthesizing responsiveness, friendliness), *competence* (also involving assurance), *information exchange* (linking to communication and information quality) and relationship *atmosphere* (incl. surrounding tangibles) as influence factors.

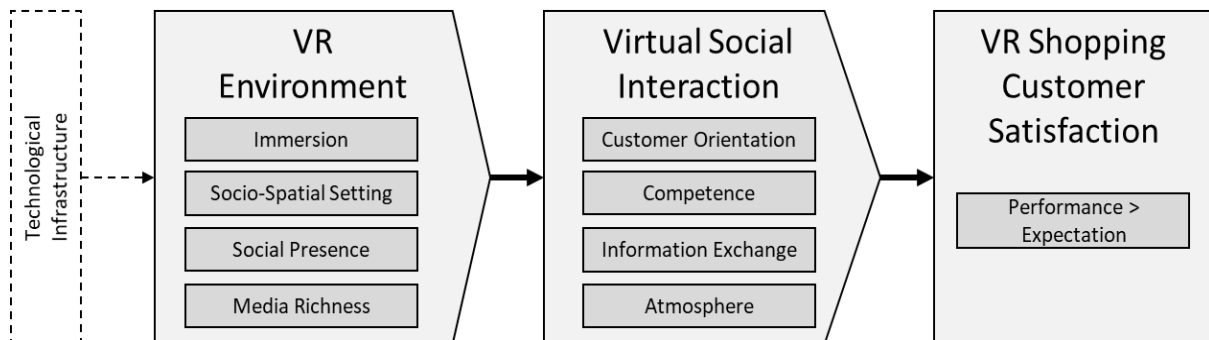


Figure 1. Influence Factors on VR Shopping Customer Satisfaction.

We arrive at the following research model for VR shopping customer satisfaction: Based on a technological infrastructure of VR hardware and system software (e.g. for connecting multiple users with head-mounted-displays) that we are not including in our current focus, we conceive customer satisfaction to be influenced by *immersion*, the *social setting*, *social presence* and *media richness* on the level of the technical VR experience, in which then virtual social interaction is taking place where the seller avatar exchanges *information* and conveys *customer orientation*, *competence* as well as a conducive *social atmosphere*. Finally, we draw on the main principle of expectation confirmation/disconfirmation (e.g. Oliver, 1977). This implies that the customers' comparison of the performance evaluation of the sales interaction with the pre-existing expectations along the modelled dimensions determines the perceived degree of customer satisfaction in a VR commerce experience.

3 Qualitative Methodology

We assessed our theoretical framework with qualitative methods, using the focused interview approach (Merton 2008). This approach is particularly focusing on complex reactions after being exposed to a concrete situation (i.e., stimulus). Such an exposure creates the benefit of concrete illustration and constitutes the focus of the interview, which is exploring the subjective meaning of the experience to the respondent. We use the exposure to a self-developed virtually mediated shopping experience as an innovative stimulus. In our case, the focused interview method is suitable as respondents are typically not able to broadly reflect on prior experiences, as we examine a very innovative environment. To create some relation to existing experiences, we selected a virtual situation that resembles a familiar shopping context. The focused interview method further requires that the significant aspects that guide and structure the interview inquiry are determined in advance by the researcher (Merton 2008). Our research model provides this guiding structure and constitutes the basis for the interview guide.

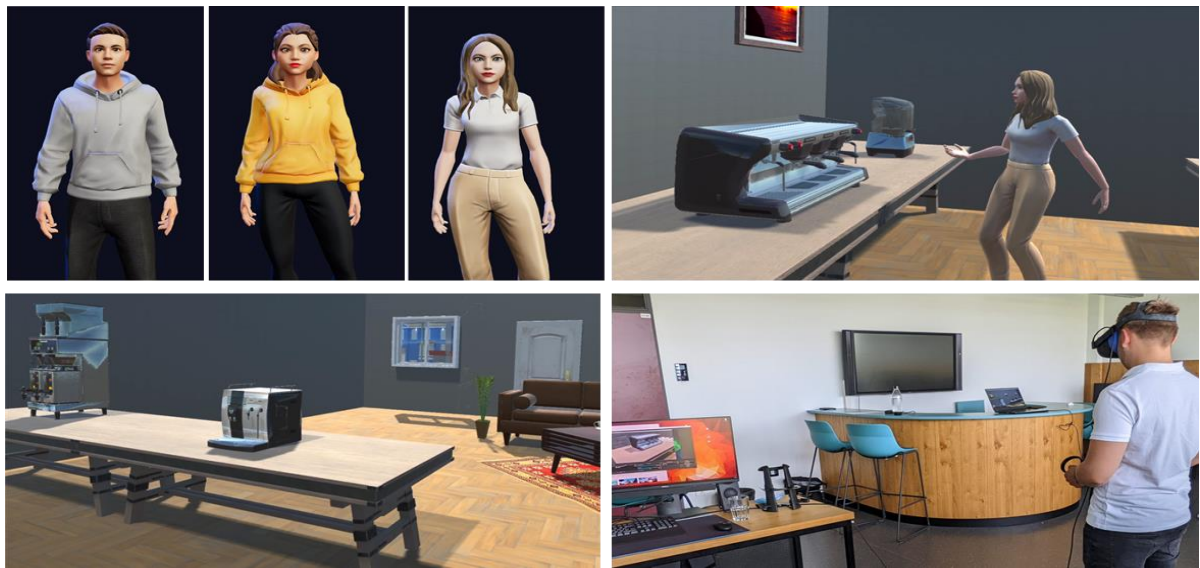


Figure 2. Impressions of the VR Shopping experience (avatars, activity, products, respondent).

Before the interviews could start, we developed an immersive multi-user virtual shopping experience in Unity (Unity, 2022) to which the respondents have been exposed. Drawing on Goffman's (1967) three elements of human interactions, this experience involved the *spatial setting* that represents a mixture of a café environment and exhibition room for coffee machines. The scene contained 3D assets such as a couch, plants and a carpet much like in a living room to emphasize a relaxed and private communicative atmosphere and signal the *occasion* of product related consultation and shopping. With regards to the *gathering of actors*, participants could choose an avatar with relaxed and neutral features that matched the ethnicity of the respondents so that the users have a high likelihood of identifying with these representations. For half of the respondents the sales person was enacted by a female using a female-looking avatar with business-casual clothing (cf. Figure 2, top left), the other half was interacting with a male seller and avatar. Participants and the sales person could move and converse freely in the setting and grab the products on sale. The sales person explained certain aspects of the products (cf. Figure 2, top right). We used the networking library Photon Fusion for Unity to connect and synchronize the seller and buyer experience in the virtual environment. After receiving a short introduction, participants have been experiencing this setting after each other, using Meta Quest 1 headsets (head mounted displays) and touch controllers. The sales person was connected to the same scene on a separate VR laptop. Users could move their bodies but most movements were carried out via the handheld touch controllers.

The initial qualitative study, reported in this research-in-progress paper, began with an intensive engagement episode in a moderated immersive VR buying experience. We invited students from different fields of study who are buying online occasionally, leading a group of 12 male and female

voluntary participants between 24 and 27 years with low or no prior VR experience. After the VR commerce experience, we carried out in-depth interviews with each person (German students and young professionals, aged 23-27). Following Merton's (2008) approach of the focused interview, the interviews were structured with an interview guide that addressed the identified theoretical concepts of the theoretical framework. Interviews lasted on average 24 minutes. The collected interview data was recorded, transcribed and then studied with qualitative content analysis based on the widely adopted methodology of Mayring (2021). This implied that the material was examined to identify evidence that corresponded with the categories that have been deducted in advance based on the theoretical foundation introduced above. A coding guide was developed that contained a definition, an anchoring example and an explication of the coding rule. The material has been reviewed twice and was randomly inspected by a second person to attain a robust result (Mayring, 2021).

4 Qualitative Findings from VR Commerce Experiences

In this chapter we present the identified empirical evidence for the theorized key influences on customer satisfaction that transpired in the focus interviews. We begin with the level of the technical VR experience before we then attend the dimension of the enacted social interaction with the seller (brackets reference respondents Rx). On a general level, we noted that all participants were satisfied with the technical implementation of the sales interaction without perceiving complications. All interviewees further appreciated the flexible opportunity to verbally interact, move around and use gestures as well as to lift and inspect the sales object. We now report the findings on the concepts in more detail.

Immersion. Immersion was noted to a varying degree. R3-R6 stated that they were able to “dive” (R3) into the virtual environment, while the surrounding reality has not been noted anymore. Others were conscious that they are not in their real world while at the same time noting that the setting was referencing familiar contexts (R1, R2, R9, R10, R12). R6 noted that the virtuality was recognizable when attending to the sales avatar, as it was rather stylized instead of realistically modelled (R6, R10). R3 and R6 reflected that it was important that the avatar matches expectations in order to not perceive a breakdown of the immersion (R3, R6). Another important disruptor were the manual controllers for moving, suggesting natural movement control as an important facet of the immersion illusion (R7).

Socio-Spatial Setting (Place). The VR-based spatial environment has been recognized as relaxing, pleasant and comfortable (R2, R4). Participants expressed positive emotions about the room (R1-R4, R10-R12) and the ability to inspect its objects from all sides (R7). The fit to the intended consultation interaction was noted as very important (R1, R10-R12). The surrounding details environment were noted as a relevant aspect that enrich and situate the interaction (R1, R11). A downside of the detailed environment was that familiarity was evaluated very differently across individuals. For example, for R5 the VR setting reminded him of a shop. R6 found the VR setting close to a realistic exhibition area. R2 felt like in a café (but missing the typical smell). R4 compared the setting to a computer game.

Social Presence enabled by the VR Setting. The perception of being present in a place was very salient (R2, R6, R7, R9, R11, R12). As a positive aspect of the setting, users felt less alone, as the seller avatar was around (R10). The importance of having an avatar in the setting was stressed by R1, who stated that her presence was supportive for orienting in the new VR environment. The seller further serves as an anchor, as it is personally recognizable in case the same environment is visited again (R1). Participants noted their own presence as well, but mainly focused their own arms and only rarely their legs (R3-R5). However, R3-R5 explicitly reported that this was sufficient for perceiving the own self sufficiently in VR, pointing to a reduced role of displaying legs. For R6, an important aspect was to be able to identify with his own avatar, which was supported by opportunities to personalize its appearance. Despite the slightly reduced realism, the seller avatar has been perceived by all as a real person. This illusion was supported by the ability to engage in a personal dialogue with the seller (R1, R2, R4-R6). Not being able to convey mimics was also considered as an advantage for introverted persons (R3).

Media Richness. Looking at the seller during his talking was very relevant for R7, suggesting an illusion of an immediate feedback channel (e.g. for sharing emotions), even though mimics were actually not supported in our study. In fact, their absence was noted as unsatisfactory by some, that felt limited in

their ability to convey emotions during the conversation (R3-R5, R9). Misperceptions were remedied with quick spoken questions (R5), gestures (R9, R10) and even positioning (R10) indicating the use of multiple information cues simultaneously. Spoken communication and in particular the ability to directly ask and engage in a quick dialog was stated as a very positive mode of interaction (R1, R3-R6). R2 and R4 pointed to the importance voice-based communication to compensate the reduced visual realism (R2, R4). Spatial cues such as pointing at the selling object or rapid body reactions were further found positive for attaining mutual understanding in VR (R2). Other respondents also noted that pointing gestures were not as accurate as in reality as the avatar did not use fingers “and then ... I do not really know, which button was meant” (R3).

Virtual Social Interaction Level. With regards to the virtually mediated social interaction, the sales avatar was perceived customer-friendly, attentive and sympathetic despite not interacting with the person in a physical environment (R1-R3, R5, R6, R9). A friendly human voice was important for the perception of customer orientation. Interviewees further noted that the avatar was directing attention to them, e.g. using gestures (R8-10) much like in a consultation setting (R1). Information exchange was perceived to have worked well and sufficient information could be attained by the participants to guide their shopping decisions (R2, R4-R6), as good as in a real consultation (R3). The sales avatar has been regarded as competent and as capable of solving customer problems, as all possible questions have been answered professionally and satisfactorily (R1-R3, R6). Interviewees positively remarked that the sales avatar looked “normal” or “average” and was not standing out in any way (R1, R2-R4) with decent colors and simple clothing with a quality that fits a professional sales context (R4, R6). Participant R3 mentioned the importance of a good fit of the (female) voice to a female looking avatar, pointing to the role of using a stereotypical sales person character. The overall impression was considered pleasant and people could easily imagine a real person behind the avatar (R4, R6). However, the interviewees also perceived limitations with haptic feedback of the shopping object and its other properties such as sounds of the product (R4). Based on the perception of the sales avatar, the interviewees described a positive and good atmosphere to the general VR-based social interaction (R1, R2, R4, R5) with a good fit to the virtual environment and the offered products (R1). In contrast to a product information talk in reality this virtual consultation was perceived as more relaxed (R3). Respondents mentioned that the perceived familiarity of the virtual room conveyed a trustable situation that influenced the perceptions (R5). People described that the realism of the experienced interaction was impressive and felt very similar to a selling-oriented conversation “as if you would normally talk...exactly like a shopping related conversation in the physical world” (R1-R3, R5, R6). The flexibility in walking around and using gestures supported the verbal communication and made it more relaxed (R6). Two participants however noted that personal aspects were limited for them (R3) and that a consultation in the real world is more tangible (R4).

Resulting Customer Satisfaction. Respondents related all mentioned factors to the resulting customer satisfaction. All reported that their expectations have been met or exceeded. While R1 and R9 were surprised how well it was possible to study the products visually and R2 was not expecting the plentiful opportunities of VR, they were stating that expectations have not been on a high level (R1, R2), pointing to the benefit of a positive surprise effect of the novel medium. R2, 3 and 6 stated that their requirements have been met and R3 further stated that this approach is a convincing alternative to an exchange in reality. R2 and R8 even noted that after the VR-based interaction they would like to buy the product. For R6, the virtual consultation was sufficient for the shopping context.

When asked directly, which aspects were contributing most to personally attaining customer satisfaction, the interviewees related to immersion, social presence, social setting, the atmosphere, competence and the underlying technology. For R3, immersing into a virtual environment was the most relevant influence. R4 and R6 emphasized the perception of a present sales person and the possibility to engage in free and personal communication with her. Further, the general VR environment of the consultation together with the structured design of the surrounding space, the warm design of the communication episode and the ability to study products were considered important for customer satisfaction (R1, R3, R4). R1, R2 and R11 mentioned the inviting atmosphere and the competent and problem-solving shopping assistant as a key influence on their satisfaction. R3 and R6 directly referred to the important role of a working technology without breakdowns for attaining customer satisfaction.

Others stressed the ability to use gestures, observe the physical movement of the other person as well as the quality and the opportunities for moving and interacting to influence their satisfaction (R3).

5 Discussion and Outlook on VR Shopping Research

Our data offers first qualitative evidence for the influence factors of our theoretical framework for customer satisfaction in VR commerce settings. The results bring together the two levels of the system-enabled VR experience and the social interaction between users into one model and demonstrate the importance of the concepts immersion, social presence, virtual social setting and the perceived richness of VR as a basis for the engagement between customers and sellers that is then further influenced by the seller's opportunities to exchange rich information (including spatial), convey customer orientation and signal competence in a conducive atmosphere. Together these factors shape the perceived performance via the comparison with prior expectations and result in a high level of customer satisfaction with VR commerce. Despite not being our focus, the responses further address how important a well-working and uninterrupted technological support is as a basis of the whole social shopping interaction.

Beyond the empirical illustration of our model, we find that participants' answers were rather homogeneous with quickly saturating responses, allowing for a lower number of interviews to compensate the extensive time and technology effort of playing through the VR experiences. All had generally very positive perceptions of VR shopping and would like to repeat the shopping interaction in a VR setting or even use it for real purchases. This promising alternative was regarded as particularly suitable for products that require much information before the purchase. On the other hand, the experience was very new to the users. While this resulted in some irritation about movements controls or the absence of noticeable physical reality, a short adaptation period helped to overcome these initial challenges. Some alluded to the benefits of anonymity that the use of avatars provides. The ability to flexibly create one's virtual representation was assumed to reduce prejudice. Further, people liked that they would not need to leave their private homes, which saves time and is more convenient. It was considered essential that the seller is using an avatar, i.e. that the remote interaction is with a real person.

Based on this research in progress, (our) future research can now take the research model for VR commerce customer satisfaction as a guiding framework for systematic comparisons with other age groups and backgrounds (e.g., varying VR literacy), alternative product characteristics or alternative VR technologies. While attaining further user data takes considerable effort (i.e., enacting the experience and surveying), we intend to collect data from more users to eventually test the model with quantitative approaches. Further, interviews will zoom in on individual aspects such as the influence of social presence on the perception of the competence of the avatar. The role of spatial distance in the virtual environment may influence the perceived immediacy of another person and thus appears an innovative contributor to social presence. A comparative study will yield insights how VR shopping environments compare to but also augment other sales channels such as e-commerce or in-shop experiences. Longitudinal study designs can further reveal behavioral changes and routinization effects over time. Finally, the framework presented in this study offers a systematic starting point to explore individual design decisions that may frame the influencing factors. For example, how can the social virtual setting be optimized in their VR design, recognizing that the metaphor of the room was reflected very differently. The scenario can also be changed to examine a comparable VR-based interaction with an automated agent. These promising avenues for further research are just a few examples for the many interesting open questions that need to be examined in order to improve our understanding of VR-based commerce settings as a possible future element in the sales channel repertoire of companies.

References

Alsop, T. (2022). *Virtual reality (VR) – statistics & facts*. URL: <https://www.statista.com/topics/2532/virtual-reality-vr/#dossierKeyfigures> (visited on August 20, 2022).

- Bailenson, J. N., Yee, N., Blascovich, J., Beall, A. C., Lundblad, N. and Jin, M. (2008). The use of immersive virtual reality in the learning sciences: Digital transformations of teachers, students, and social context. *The Journal of the Learning Sciences* 17(1), 102–141.
- Berweger, T. (2020). *Neue Chancen im Onlinehandel - Virtual Reality im E-Commerce*. URL: <https://digital-commerce.post.ch/de/pages/blog/2020/virtual-reality-im-e-commerce> (visited on July 7, 2022).
- Biocca, F., Harms, C. and Burgoon, J. K. (2003). Toward a More Robust Theory and Measure of Social Presence: Review and Suggested Criteria. *Presence: Teleoperators and Virtual Environments* 12(5), 456–480.
- Daft, R. L., Lengel, R. H. and Trevino, L. K. (1987). Message equivocality, media selection, and manager performance: Implications for information systems. *MIS Quarterly* 11(3), 355–366.
- Freeman, G. and Maloney, D. (2020). Body, Avatar, and Me: The Presentation and Perception of Self in Social Virtual Reality. *Proceedings of the ACM on Human-Computer Interaction*, 1-27.
- Goffman, E. (1967). *Interaction Ritual – Essays on Face-to-Face Behaviour*, New York: Pantheon Books, Random House.
- Harrison, S. and Dourish, P. Re-Place-Ing Space: The Roles of Place and Space in Collaborative Systems. In: *Proceedings of the 1996 ACM Conference on Computer Supported Cooperative Work*, 1996, 67–76
- Hila Ludin, I. H. B. and Cheng, B. L. (2014). Factors Influencing Customer Satisfaction and E-Loyalty: Online Shopping Environment among the Young Adults. *Management Dynamics in the Knowledge Economy* 2(3), 462–471.
- Jerald, J. (2016). *The VR book: Human-centered design for virtual reality*. Association for Computing Machinery and Morgan & Claypool, Lebow.
- Lee, K. C. and Chung, N. (2008). Empirical analysis of consumer reaction to the virtual reality shopping mall. *Computers in Human Behavior* 24 (1), 88–104.
- Mayring, P. (2021). *Qualitative content analysis: a step-by-step guide*. London: Sage.
- McVeigh-Schultz, J., Kolesnichenko, A., and Isbister, K. (2019) Shaping pro-social interaction in VR: an emerging design framework. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, Glasgow, UK.
- Merton, R. K. (2008). *Focused interview*. NYC: Simon and Schuster.
- Oliver, R.L. (1977). Effect of expectation and disconfirmation on postexposure product evaluations: An alternative interpretation, *Journal of Applied Psychology* 62, 480–486.
- Parasuraman, A., Zeithaml, V. A., and Berry, L. L. (1988). SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality. *Electronics Letters* 64(1), 12-40.
- Pizzi, G., Scarpi, D., Pichierri, M., and Vannucci, V. (2019). Virtual reality, real reactions? Comparing consumers' perceptions and shopping orientation across physical and virtual-reality retail stores. *Computers in Human Behavior* 96 (2), 1-12.
- Rapp, R. (1995). *Kundenzufriedenheit durch Servicequalität: Konzeption - Messung - Umsetzung / Customer Satisfaction through Service Quality*. Wiesbaden, Germany: Springer.
- Schneider, W. and Kornmeier, M. (2006). *Kundenzufriedenheit: Konzept, Messung, Management / Customer Satisfaction Concept Measurement and Management*. Bern: Haupt.
- Schultze, U. and Brooks, J. A. M. (2019). An Interactional View of Social Presence: Making the Virtual Other 'Real'. *Information Systems Journal*, 29(3), 707–737.
- Sherman, W. R. and Craig, A. B. (2003). *Understanding virtual reality*. San Francisco, CA: Morgan Kauffman.
- Short, J., Williams, E., and Christie, B. (1976). *The social psychology of telecommunications*. Toronto; London; New York: Wiley.
- Slater, M. and Wilbur, S. (1997). A framework for immersive virtual environments (FIVE): Speculations on the role of presence in virtual environments. *Presence: Teleoperators & Virtual Environments* 6(6), 603-616.
- Unity (2022). *The future is yours - the world's leading platform for real-time content creation*. URL: <https://unity.com> (visited on August 1, 2022).