



Do augmented and virtual reality technologies increase purchase intention?: The role of cognitive elaboration and shopping modes

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Introduction. Augmented Reality (AR) and Virtual Reality (VR) have been increasingly used in retail environments, offering a powerful tool to improve customer engagement and satisfaction (Jiang, 2017). Industry reports predict that AR and VR will generate \$105 billion in revenue by 2022 (Digi-Capital, 2018), and the consumer goods and retail industry will become the biggest markets for AR and VR (Murray, 2018). VR, typically utilizing a wearable device, creates an interactive computer-generated experience within a simulated environment and allows apparel retailers to provide consumers with engaging virtual experiences like 3D virtual store tour and virtual fashion shows (Bonetti et al., 2018). While similar to VR, AR integrates virtual elements into the real-world environment and enables retailers to improve the visualization of products. For instance, the AR-based “virtual try-on” technology allows consumers to use the webcam to overlay a product image on their own reflection so consumers can virtually try on the product. The current research focuses on the ‘virtual try-on’ technology (‘AR’ hereafter) and the ‘3D virtual store’ (‘VR’ hereafter) incorporated in the apparel retail website and investigates the impact of AR and VR on the consumer’s purchase intention of apparel products. Further, this research examines how different shopping modes (searching vs. browsing) moderate the impact of AR and VR on purchase intention.

Literature Review. AR is an effective tool to enhance consumers’ understanding of products since it allows consumers to view themselves wearing products without physically trying them on (Verhagen et al., 2014). Thus, when online shoppers view apparel products in the AR view in which they can see how the clothing would look like on them, their cognitive evaluation of products will be enhanced than when such option is not available on the website (Merle et al., 2012). Researchers found that, by improving product presentation formats on the retail website, AR view can increase product involvement and product attitude (Jin & Bolebruch, 2009) and perceptual curiosity about the product (Beck & Crié, 2018). Thus, it is proposed that AR will positively affect consumers’ cognitive elaboration of products and purchase intention than VR and the regular website (‘Web’ hereafter). Yet, consumers visit the website for a variety of reasons beside product evaluation. Researchers suggest that consumers’ website visits may be either goal-directed (searching) or exploratory (browsing) (Moe, 2002). Therefore, when consumers are in the searching mode with a planned purchase in mind, AR may lead to greater purchase intention than VR and Web since searchers are driven by deep product evaluation (vs. exploration). In contrast, when consumers are in the browsing mode, VR may lead to greater purchase intention than AR and Web since browsers like to explore new stimuli on the website (e.g., a 3D virtual store) with hedonic motives rather than deliberately finding product

information. Thus, the impact of AR and VR on purchase intentions may be contingent on whether consumers are in the searching or browsing mode. Lastly, it is hypothesized that the interaction effect between product presentation technologies and a shopping mode on purchase intention is mediated by cognitive elaboration. Thus, three research hypotheses are developed as follows: **H1**: AR will lead to greater (a) cognitive elaboration and (b) purchase intention than VR and Web; **H2a**: When consumers are in the searching mode, AR will lead to greater purchase intention than VR and Web; **H2b**: When consumers are in the browsing mode, VR will lead to greater purchase intention than AR and Web; **H3**: The interaction effect between product presentation technologies and a shopping mode on purchase intention will be mediated by cognitive elaboration.

Methodology. Two experiments were conducted with a mock women's apparel brand's website. The AR site featured a 'Virtual Try on' button on every product page so participants can virtually try on the garment using a webcam. The VR site featured the additional 3D virtual store of the brand's physical store designed based on the modern theme congruent with the brand image reflected on the website. Participants could virtually navigate the 3D store with a mouse and clicking on different hot spots. The regular website featured neither technology. Other than the presence of AR and VR technology, all website features remained constant across the three experimental conditions. Study 1 employed a one-factor (technologies: AR, VR, Web) between-subjects online experiment. Female participants ($N = 403$) recruited from a national consumer panel were randomly assigned to one of the three conditions. After exploring the website, they completed a questionnaire that included dependent measures (cognitive elaboration, purchase intention). Study 2 employed a 2 (shopping modes: searching vs. browsing) \times 3 (technologies: AR vs. VR vs. Web) between-subjects design in a controlled lab setting. A total of 196 female undergraduate students were recruited from a large Southwestern university in the U.S. They were invited to the lab, randomly assigned to one of the six experimental conditions. The shopping modes were manipulated with the scenario describing the two shopping modes (searching vs. browsing) adapted from the previous study (Schlosser, 2003). In Study 2, participants in the VR condition viewed the 3D virtual store in a fully immersive environment using a headset provided in the lab.

Results. In Study 1, results of a one-way ANOVA and Bonferroni multiple comparison tests indicated that respondents in the AR condition exhibited greater cognitive elaboration ($M_{AR} = 4.88$, $M_{VR} = 4.26$, $M_{Web} = 3.75$, $p = .028$) and purchase intention ($M_{AR} = 5.03$, $M_{VR} = 4.02$, $M_{Web} = 3.80$, $p = .000$) than those in the VR and Web condition, supporting H1. In Study 2, we conducted a 2 (shopping modes: searching vs. browsing) \times 3 (technologies: AR vs. VR vs. Web) ANCOVA with purchase intention as the dependent variable and product involvement as a covariate. The result indicated that respondents in the AR and VR condition exhibited stronger purchase intentions than those in the Web condition under the searching mode ($M_{AR} = 4.99$, $M_{VR} = 5.00$, $M_{Web} = 4.15$, $F(2, 189) = 4.33$, $p = .015$), partially supporting H2a. On the other hand, respondents in the VR condition showed stronger purchase intentions than those in the AR and Web condition under the browsing mode ($M_{VR} = 5.92$, $M_{AR} = 4.90$, $M_{Web} = 3.66$, $F(2, 189) = 11.64$, $p = .000$), supporting H2b. Finally, we conducted a moderated mediation analysis to test

H3 (PROCESS model 7, Hayes, 2013). The result revealed that cognitive elaboration partially mediated the interaction effects on purchase intentions in the browsing condition ($B = .22$, $SE = .091$, 95% CI [0.05, 0.41]) but not in the searching condition.

Discussion. The findings provide empirical evidence that AR and VR can be effective tools to increase customer engagement and purchase intention. First, presenting products using the AR technology (i.e., “virtual try-on”) on the website can increase the consumer's purchase intention as well as cognitive elaboration of products. Yet, for those who simply browse the website with no specific shopping goal, VR (i.e., providing a 3D virtual store experience) seems a more effective tool for increasing purchase intention than AR and Web. For consumers in the searching mode, both AR and VR elicited more positive brand evaluation as compared to the website without such technology. One explanation for this result may be that the scenario to prime the searching mode in this study described “the goal of efficiently finding something specific.” Future research may design the searching goal as more specifically geared toward product evaluation (e.g., the goal of finding a product that fits a certain occasion like a job interview or a party) so a better fit between the technology and the shopping mode can be established.

References

- Beck, M. & Cri , D. (2018). I virtually try it . . . I want it! Virtual fitting room: A tool to increase on-line and off-line exploratory behavior, patronage and purchase intentions. *Journal of Retailing and Consumer Services*, 40, 279-286.
- Bonetti, F., Warnaby, G., & Quinn, L. (2018). Augmented reality and virtual reality in physical and online retailing: A review, synthesis and research agenda. In Jung, T. & tom Dieck M. C. (Eds.), *Augmented reality and virtual reality* (pp. 119-132). New York: Springer.
- Digi-Capital (2018). Ubiquitous \$90 billion AR to dominate focused \$15 billion VR by 2022. Retrieved from <https://www.digi-capital.com/news/2018/01/ubiquitous-90-billion-ar-to-dominate-focused-15-billion-vr-by-2022/>
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: The Guilford Press.
- Jiang, E. (2017). Virtual reality: Growth engine for fashion? *Business of Fashion*. Retrieved from <https://www.businessoffashion.com/articles/fashion-tech/virtual-reality-growth-engine-for-fashion>
- Jin, S. A. & Bolebruch, J. (2013). Avatar-based advertising in Second Life. *Journal of Interactive Advertising*, 10, 51-60.
- Merle, A., Senecal, S., & St-Onge, A. (2012). Whether and how virtual try-on influences consumer responses to an apparel web site. *International Journal of Electronic Commerce*, 16(3), 41-64.
- Moe, W. W. (2002). Buying, searching, or browsing: Differentiating between online shoppers using in-store navigational clickstream. *Journal of Consumer Psychology*, 13(1&2), 29-40.

- Murray, S. (2018). Worldwide spending on augmented and virtual reality to achieve a five-year CAGR of 71.6% by 2022, according to IDC. IDC. Retrieved from <https://www.idc.com/getdoc.jsp?containerId=prUS43860118>
- Schlosser, A. E. (2003). Experiencing products in the virtual world: The role of goal and imagery in influencing attitudes versus purchase intentions. *Journal of Consumer Research*, 30, 184-198.
- Verhagen, T., Vonkeman, C., Feldberg, F., & Verhagen, P. (2014). Present it like it is here: Creating local presence to improve online product experiences. *Computers in Human Behavior*, 39, 270-280.