

Developing an Interactive Technological Framework in the Retail Apparel Industry: VR, AR, SC, and AI

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More retail companies have started implementing interactive technology into their online and in-store shopping experience for their customers. In general, interactive technology is used to describe several forms that are used in the apparel industry to help stimulate customer experience, whether it is online or in-store (Sayed, 2019). In a study conducted by Wang (2020), it found that 72% of Millennial consumers preferred to spend money on an experience rather than on materialistic items, and those consumers were 74% more likely to buy a product after a meaningful brand experience. Leading companies like Burberry, Sephora, Amazon, Gucci, Tommy Hilfiger, Nordstrom, H&M, IKAR, and Stitch Fix have started implementing interactive technology such as augmented reality (AR), virtual reality (VR), spatial computing (SC), and artificial intelligence (AI) (Sayed, 2019; Binns, 2019; Cision PR Newswire, 2019; Schmelzer, 2019). By implementing these technologies, it helps to stimulate and improve the shopping experience for the customer and brand loyalty (Sayed, 2019; Burberry, 2020; D'innocenzio, 2015).

The purpose of this research is to explore interactive technology used in the apparel industry and to define its constituents. By doing this, an interactive technological framework is proposed that discusses technology under the interactive umbrella in the apparel industry. As technology has become cheaper and more accessible, retailers have been able to invest more money and thought into incorporating these interactive technologies into their business strategies (Sayed, 2019; Wang, 2020). Thus, this research aims to provide insights into the functions of the interactive technology umbrella and how it is currently being used by different companies in the industry and potential applications in the retail sector. Currently, many industry professionals are unaware of how to properly implement these technologies into their business strategies. This framework provides a defined and organized map of better understanding interactive technology within a retail environment.

The terms used in the proposed framework have been gathered and defined from a literature review and market research that encapsulates an understanding of how artificial intelligence, augmented reality, virtual reality, and spatial computing have been used as an interactive feature in retail shopping. Some features within these separate technologies bridge into the next as denoted by arrows in figure 1. The analysis of the above framework shows that all forms of interactive technology utilize artificial intelligence as a base component to build their information. Then, it is separated into three categories: virtual reality, augmented reality, and spatial computing. Augmented reality uses the virtual reality aspect by putting the virtual product within the physical world. Spatial computing allows the virtual product to be placed and interact in the physical world, using components of both virtual reality and augmented reality. While

virtual reality gives the customer the virtual product, it is separate from the physical world, thus retrieving artificial intelligence for data and learning purposes (Wang, 2020). The researchers used 3D CLO software to create the visual images for Figure 1 so the concept of each technology is visually effective.

Based on the literature review and the market research, the following terms are defined in relation to apparel industry and how they are used and related with each other as an interactive platform. *Artificial intelligence* is used to create a data driven business where computers can accurately decide size and fit needed in manufacturing, pattern making, forecasting sales production, supply chain management, and being used as the learning component in virtual reality, augmented reality, and spatial computing (Schmelzer, 2019; Guo et al., 2011). *Virtual reality* within the apparel industry can mostly be seen with the interactive option of virtual fitting rooms (VFR). For instance, Polo Ralph Lauren has been using VFR technology from the company Oak Labs and one option customers can choose when using VFR technology is the lighting in the fitting room. RFID tags on clothing allow the mirror to show virtually the clothes customers have brought into the room and the mirror also displays stock amounts and color options available in store, with recommendations for outfits that match with the items brought in. Other companies include Pakf Alto that uses Memory Mirror and Razorfish Emerging Experiences which combines VFR and AR technology together in order to create VFR for customers that can create and save their personalized avatar, then avatars can be used to try on various types of clothing options to assure fit accuracy (Pachoulakis & Kapetanakis, 2012).

Within the apparel industry, *augmented reality* has been used by several companies and it is “a medium in which information is added to the physical world in registration with the world” (Craig, 2013, p. 4). Companies such as Burberry and Gucci partnered with IT experts and allowed customers to use the AR function which puts the virtual product into their physical world and allowed customers to pick the size, style, and color of a specific item and it is placed into their physical world to try on (Binns, 2019; Burberry, 2020). Currently, the application of AR has been used by luxury and designer’s brands to provide exclusive experience for their customers. *Spatial computing* is a combination of computer vision and AI that can fully morph virtual content into the physical world (Wang, 2020). H&M has used spatial computing in collaboration with the company Magic Leap in 2018 when H&M debuted their collection that was collaborated with Moschino. At this New York runway event, guests were able to explore virtual items of the event within their physical world. A design and manufacturing company called IKAR has been also using spatial computing to create 3D models so that they can create an immersive, more accurate, engaging, and cheaper experience in the manufacturing process (Cision PR Newswire, 2019). Under the umbrella of AI, there are many ways in which information can be added and modified in the physical world, opening new opportunities for merging AI, VR, AR, and SC into a seamless application.

The presentation of this study includes detailed layout and discussions of the interactive technological framework with examples and future applications in the industry. By providing this analysis, companies who begin utilizing interactive technologies into their business strategy have a greater understanding of how they interact and improve their customer experience based on their customers' needs and wants. Lastly, future research in this area could investigate how retailers could incorporate multiple components of these technologies seamlessly using online and in-store formats for sales and marketing strategies. More research needs to be done to further innovate interactive technologies visual features, to be able to bring a more real experience rather than virtual. Additionally, these technologies need to become more readily available for the majority of retail companies to use, now it mostly being tested by luxury and higher end brands.

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