Extended Reality (XR) in the Digital Fashion Landscape

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Abstract. The fashion industry is progressively investing in technology, and the benefits of Extended Reality (XR) are not going unnoticed. Despite widespread interest in the topic, the literature is limited and the topic is poorly understood. This study brings XR in fashion to the forefront. Based on a review of several sources (latest news, reports, and literature), it describes the current landscape, presents the advantages and downsides of immersive technologies, and provides useful advice for practitioners. The results suggest that brands can leverage XR to establish close connections with consumers through personalised experiences and compelling stories. Moreover, some of the intricacies of XR are discussed, namely, costs and unresolved technical issues. Crafting meaningful XR experiences requires expertise in multiple domains, adding value to consumers through enhanced features and striving for quality.

Keywords: Immersive media · Digital Fashion · Fashion Communication · User Experience Design · Storytelling

1 Introduction

The rise of Extended Reality (XR) mirrors the current hyper-connected society, who craves the digital world, expressing an urge to submerge and expand their senses in the frontiers of technology [1]. XR comprises existing immersive technologies, i.e., augmented reality (AR), virtual (VR), and mixed reality (MR) and those who might be created in the future [2]. The term XR is commonly known as immersive media or spatial computing [3].

In the report "The State of Fashion Technology," The Business of Fashion and McKinsey & Company experts mention that it is expected that fashion companies increase technology investment between 3 and 3.5 percent by 2030 [4]. Furthermore, according to Statista [5], the global XR market hit 28 billion U.S dollars in 2021, and by 2028 is predicted to reach over 250 billion. This raises the question: why should fashion brands care about XR?

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Rock Paper Reality—a consulting agency in immersive technologies, suggests that XR can bring several benefits to brands, e.g., enhance recall and recognition, collect data about consumers to improve marketing strategies [6]. Moreover, XR creates opportunities by offering innovative ways to engage with consumers [7]. Despite the benefits, the number of brands and retailers that embraced technology competitively is limited [4].

In literature, there is a growing interest in fashion and the virtual world. Baek et al. [8] conducted a systematic literature review and found that the first publications on the subject started in 2003 and the number significantly increased after 2011, becoming one of the most researched topics in the domain of digital fashion in 2021. In addition, the authors suggest several research avenues. Indeed, XR is constantly evolving and is not yet well understood.

Marketing futurists Hackl and Wolf [9] remarked that sooner or later VR/AR will become mainstream and brands will have to understand what experiences they need. As a result, this study aims to reflect on the landscape of XR in Fashion. It delves into opportunities and obstacles of XR technologies, and offers guidance to practitioners who want to explore them. To investigate the subject, a buzz report was conducted. Buzz report is a design method that helps to develop "a broad understanding of what is currently significant" on a given topic [10, p. 23] by collecting information from several sources. Two researchers captured the latest news, reports, and literature on the subject. Afterwards, the findings were aggregated for group discussions.

2   Extended Reality in Fashion

The computer graphics (CG) artist and XR designer Hillmann [3] remarked that overall, most XR projects are planned for event-driven experiences, such as marketing events, presentations and showcases. The buzz report revealed that companies are using XR for particular purposes. From a marketing perspective, XR has been implemented in product launches, advertising campaigns, and fashion shows. When it comes to brick-and-mortar stores and e-commerce, there is a wide range of practical applications to enhance customer experience, e.g., virtual showrooms, magic mirrors, in-store navigation apps (see Fig. 1).

AR and VR are also disrupting how fashion brands interact with consumers by creating immersive customer experiences and telling their stories innovatively. For instance, consumers can try on clothes virtually according to their preferences [11], and experience virtual rooms in fashion stores [7]. According to Hillmann [3], brand storytelling is a golden opportunity: "To tell a brand's story in XR means to go beyond the confines of 2D media formats and create a closer, more personalized connection with the user" [3, p.229]. Ultimately, the purpose of storytelling experiences is to change the mindset of people, prompt them to act, in other words, persuasion [12].

Similar to other technologies, XR has benefits and drawbacks. On the bright side, XR unlocks multiple paths to increase brand value. This medium allows to collect comprehensive data of consumers—interactions, interests, product usage, etc. that can be used to refine marketing strategies and provide personalised experiences [9]. The report "The State of Fashion Technology" observes:

"… the aim would be to offer every shopper, or as many as possible at least, individualised service and communications, from recommending products based on their taste when they enter a store, to serving them the most relevant products when they open the brand's app to sending emails letting them know when items they might like have arrived at a store nearby" [4, p.44].
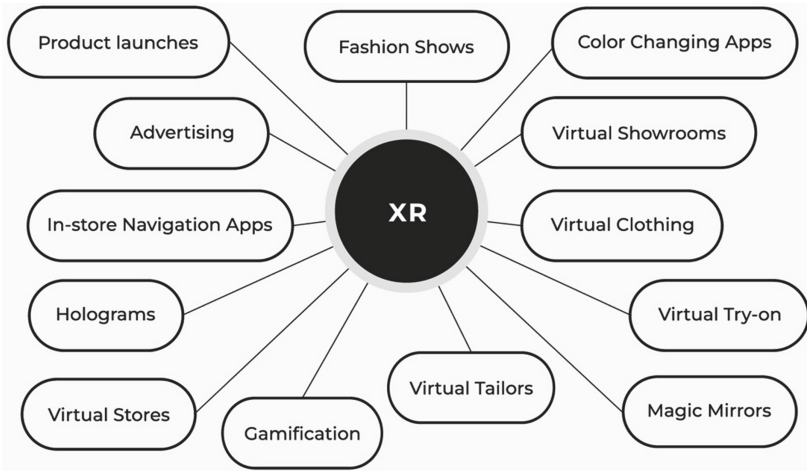
Fig. 1. XR in Fashion.

Although XR provides analytics to help understand consumer behavior, it does not provide the full picture—quantitative methods indicate data to answer "how much" questions, whereas qualitative methods answer "why or how" questions [13]. Research into consumer experience with XR over the last decade focuses on adoption, preferences, and attitudes [8]. Xue et al. [14] add that more research is needed to understand consumers' desires and needs.

Conversely, XR presents challenges that might avert brands from investing. One of the barriers is the costs associated with implementation, content production, and maintenance [2, 9, 15]. Besides being expensive, there are critical technical issues regarding hardware and software [2, 12]. These issues pose risks because if people do not enjoy the first impression, they might not invest time with the technology in the future [12].

Then, complexity, i.e. "traditional UX design" (web and mobile) has well established practices compared to XR, which "is still the "Wild West" to some degree" because of the broad scope of technologies, tools, and platforms involved [3, p.105]. Furthermore, usability testing of VR applications must be in person if the app is not available remotely, posing challenges when it comes to budget and time [3].

3   Recommendations on Marketing, User Experience and Storytelling for XR

Hackl and Wolf [9] described VR/AR as "bright and shiny objects," and urge companies, brands, and marketeers to not get distracted by them. The authors go on arguing that marketing fundamentals should not be dismissed, advocating that immersive experiences should be integrated with a campaign to enhance it, as creating the experience per se is not enough. To prevent distractions, the authors suggest answering questions like: "Is this experience something my target audience would want to do? What do I want my customer to feel? How does it make them feel about my brand?"; "Will this experience augment brand loyalty or increase engagement? How long do I want them to have this experience?"; "How will there be a beginning, middle, and end of the experience? Are there multiple plotline choices along the way?"; among others (see chapter 8 from [9]).

Regarding designing immersive experiences, Hillmann [3] explains that in the beginning there should not be considered technical restrictions when ideating the best solution for users—which in turn, will enable teams to conduct proper research to understand people's needs. The author also believes that in the prototyping and testing stage, designers need to embrace the possibilities and limitations of a toolset, platform, and framework as this will have significant impact on how users perceive the experience. Despite the variety of devices available, the fundamentals (see Table 1) are the same [3].

In a similar vein, the essence of storytelling stays unchanged regardless of digital, but XR can take stories to a whole other level through branching narratives[1] and exploring levels of intensity that were never experienced before [9, 12]. Bucher [12] notes that it is imperative to establish the objective of the storytelling experience (entertain, inform, or persuade) before ideation. To create narratives successfully, the author further suggests determining who the audience is, and consider it throughout the process: "Envision the person you assume most likely to buy or appreciate your project. Keeping the embodiment of that person in the forefront of your creation process will often be all that is needed in order to craft a successful narrative" [12, p.94].

Hartson and Pyla [16] note that designing for a quality user experience is imperative, given information pervasiveness overload alongside the fact most people are expected to be tech-savvy. According to the authors, technological advances are making us rethink what quality means, supporting that quality products are those that ensure the best user experience, considering technological limitations.

4   Discussion

In an era where consumer expectations are high and the competition is tough, brands cannot make mistakes as explained by Applause, a crowd-sourced digital quality testing company [17]. The authors also support that orchestrating outstanding digital experiences requires three ingredients: intuitive interfaces; seamless customer experiences across channels; and features valued by users [17].

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[1] "Branching narratives refer to the use of nonlinear story structure that allows users options that progress the story along. Options continue to be offered to users until either each option is given an ending or a series of options eventually leads to the same ending as a series of other options" [12, p.311].

Table 1. Core elements of XR Design. Based on Hillmann [3].

Element	Considerations
Comfort and safety	Comfort issues tend to lead to technology rejection; Rapid movements and misperceived distances are common with headsets
Interaction	The way how users are informed on how to interact with objects, e.g. a text pop-up over a drawer saying "Open me."
Environment and spatial components	Questions related to context: play area, seated vs. standing, orientation assistance touch, etc
Sensory input	Visual clues, audio navigation, as well as haptic feedback using the motion controllers are part of the designer's toolkit
Engagement	To ensure user engagement: guide the user, eliminate the friction, give incentives, and pave the way for satisfaction and meaningful experiences; use storytelling and gamification; test and prototype
Constraints	Design, impose, and manage constraints; Restrict unnecessary or harmful actions; help with discoverability and feedback
Inclusion, diversity, and accessibility	Consider the user's situation: physical or mental abilities, cultural and ethnic backgrounds, and the sociological impact of the design

Certainly, XR is gaining in popularity and people are eager to try it, but consumers' interest will not be sustained if brands do not create value with XR experiences. This can prove to be a serious challenge for brands in the attention crisis that we are facing [18]. From Levitt's et al. [19] point of view, the reason why so many products/services fail is because speed is prioritized, and quality is often disregarded. The author advocates remembering quality over speed and considering the customer experience holistically:

"Building quality isn't just about technical excellence. It's also about CX excellence. A crappy interface that doesn't have tech bugs is still a crappy interface and likely to cause customer dissatisfaction. We must aim for quality in all areas" [19, p.283].

XR experiences raise vexed issues concerning the role of designers in the XR space. Clients can choose to work with companies where there are professionals devoted to both design and coding or opt for "XR ninjas," who are capable of dealing with problems and use proper tools to deliver final solutions [3]. XR designers have to demonstrate vast knowledge in several domains:

"Next to fundamental understanding of the UX process and XR basics, knowledge of 3D and animation tools, a good understanding of the current state of solutions

(...), and a good understanding of the possibilities and limitations of the various frameworks, visual scripting solutions, and tools, plus the need to keep an eye on the ever-changing XR landscape" [3, p.106].

The know-how required to craft XR experiences and the complexity inherent to the field might lead researchers to rethink how studies are conducted. For example, projects in this field may benefit from cross-functional teams and transdisciplinary approaches, as well as, going beyond technical issues and focusing on consumer experience.

Another aspect to examine is the nature of XR. Hackl and Wolf [9] claim that VR experiences are considered isolating experiences—a premise that might soon be changing with the social nature of the Metaverse[2]. The Business of Fashion [21] mentions that innovating in the metaverse can raise fashion companies' revenues by more than five percent in the next two to five years (see [22] for a comprehensive account of fashion and the Metaverse).

5   Concluding Thoughts

Extended Reality opens up opportunities for fashion companies to engage with consumers. Consequently, brands are increasingly investing in technology and revenue forecasting seems promising. Notwithstanding, when creating XR experiences, brands might encounter barriers and face challenges.

On the one hand, AR/VR enable brands to enhance experiences and explore innovative ways to tell stories, and thus increase brand value. The XR space is also highly measurable and provides marketers with data that can be used to tailor consumer shopping experiences. On the other hand, XR is expensive and the technical issues involved entail risks that might negatively impact consumers' perceptions. Moreover, designing for XR is more complex than designing for web and mobile environments because it demands more knowledge on diverse subjects.

Some of the recommendations given for those who intend to explore immersive technologies include not getting distracted by technology, conducting research, and imagining the experience with consumers in mind. Achieving digital excellence in XR means adding value and prioritizing quality over time.

To conclude, it is expected that immersive environments will keep evolving, moving towards new paradigms. This paper contributes to our understanding of XR in fashion by outlining themes that can form an agenda for future work. Hopefully, this study will inspire and encourage practitioners and researchers to discover how to maximize XR's potential.

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[2] "The envisioned future iteration of the internet that is made up of 3D virtual spaces linked within a perceived virtual universe. In a broader sense, it often refers to not just virtual worlds, but the full spectrum of virtual reality, augmented reality and the internet" [20, p.128].

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