



Research Exposé: The future of Extended Reality in fast fashion: the impact of XR acceptance on consumer behaviour and brand equity

<u>Submitted by:</u> Student: Silvia Fernández Preguntegui Supervisor: Katrin Zulauf & Ralph Wagner Academic Year: 2022 / 2023 Kassel, 23/10/2022

> University of Trento - Department of Economics and Management University Savoie Mont Blanc - IAE Savoie Mont Blanc University of Kassel - School of Economics and Management University of León - Faculty of Economics and Business Studies

ii

Abstract

Fast fashion businesses underwent a significant digital transformation to survive in their competitive industry. Fast fashion companies have followed the lead of luxury fashion brands by launching digital fashion collections, augmented reality fitting rooms, interactive fashion shows, and more. The common ground between these fashion applications is the extended reality technologies. Extended reality (XR) is a concept that involves virtual reality, augmented reality, and mixed reality. These technologies and their different applications are changing the fashion consumer experience. The present study aims to apply the Unified Theory of Acceptance and Use of Technology (UTAUT) to explore the drivers of XR's adoption intention by fast fashion consumers and inquire into their cause-effect relationships with customer engagement, brand awareness and brand loyalty. Through an online survey of fast fashion consumers from European countries, the study employs a quantitative approach. The expected contributions in the academic literature focus on user acceptance and consumer behaviour towards XR in the fast fashion context. It also provides practical contributions to the fast fashion business, as these technologies have great potential to improve the consumer experience. Marketing campaigns, customer interaction, or even a new sales channel are some use cases for the XR. Since it is a new technological tool that presumes a high level of immersion, presence, and interaction, it may have an impact on how society engages with its surroundings.

Keywords: Extended Reality, Virtual Reality, Augmented Reality, Mixed Reality, UTAUT, consumer behaviour, brand equity, fast fashion

Table of Contents

Abstract	iii
List of Abbreviations	v
List of Figures	vi
List of Tables	vii
1. Introduction	1
2. Theoretical Framing	3
2.1 Extended Reality Technologies	3
2.2 Fast fashion	7
2.3 Unified Theory of Acceptance and Use of Technology (UTAUT)	8
2.3 Customer engagement	8
2.3.1 Brand loyalty	9
2.3.2 Brand awareness	9
2.4 Alternative theory: Meta-UTAUT	9
3. Literature Review	
4. Research Model and Hypotheses	
5. Methodology	
6. Expected Contributions	21
6.1 Scholarly Contributions	21
6.2 Implications for Business and Society	21
7. Chapters Overview	21
8. Work Plan	
9. References	23

List of Abbreviations

AR	Augmented Reality
BA	Brand Awareness
BI	Behavioural Intention
BL	Brand Loyalty
CE	Customer engagement
EE	Effort Expectancy
FC	Facilitating Conditions
MR	Mixed Reality
PE	Performance Expectancy
SI	Social Influence
TAM	Technology Acceptance Model
UTAUT	Unified Theory of Acceptance and Use of Technology
VR	Virtual Reality
XR	Extended Reality

List of Figures

Figure 1.	Virtuality Continuum (Milgram & Kishino, 1994)	4
Figure 2.	Proposed Reasearch Model1	6

List of Tables

Table 1. Literature review	11
Table 2. Constructs and respective items composing the model	17
Table 3. Work Plan Table	22

1. Introduction

Technology is constantly changing how society relates to itself and its environment. The fast fashion industry is not lagging and uses the most innovative applications to grow its sales. In 2021, the fast fashion industry's global market size stood at USD 91.23 billion, and by 2022 it will grow to USD 99.23 billion at a compound annual growth rate of 8.8%. Even the forecast data for 2026 is \$133.43 billion at a compound annual growth rate of 7.7% (The Business Research Company, 2022). One way to sustain this growth is by offering innovative customer experiences through virtual reality (VR), augmented reality (AR), and mixed reality (MR), which compose extended reality (XR) (Boardman et al., 2020; Goel et al., 2022; Joy et al., 2022; Mystakidis, 2022; The Business Research Company, 2022). The key drivers of these technologies have been the expansion of e-commerce and COVID-19, which leads customers to prefer buying clothes online without trying them on beforehand or seeing them physically in the store (Goel et al., 2022; Niu, 2020; Rana, 2021).

Each of the realities (VR, AR and MR) included in the XR have different definitions and functionalities. VR replaces our real environment with a computer-generated environment (Yeung et al., 2021). AR projects digital items onto the visible surroundings (Flavián et al., 2019; Javornik, 2016). MR is a term that can lead to misunderstandings, but for this research, the definition provided is a combination of VR and AR that allows a vivid interaction with computer-generated content (Flavián et al., 2019; Ong et al., 2021; Speicher et al., 2019). Despite their differences, the three realities share three characteristics: immersion, presence and interaction (Cipresso et al., 2018; Ong et al., 2021; Silvestri, 2020; Yeung et al., 2021). The qualities will be discussed in more detail in the theoretical framing section. Regarding the XR applications in the fashion industry, companies have long used VR, AR and MR technologies in order to improve their customer experience. XR does not require a specific device, as it can be used from personal devices (laptop, mobile, VR headset, etc.) and in-store devices (Joy et al., 2022; Silvestri, 2020). It is worth noting to mention that the metaverse is able to develop and expand its application possibilities thanks to XR (Mystakidis, 2022). The metaverse trend is proving that the XR will become part of our lives and will change how we will interact with our surroundings (Bousba & Arya, 2022; Wedel et al., 2020).

Previous studies have analysed XR and its various applications in several areas, such as education (Faqih & Jaradat, 2021), medicine (Li et al., 2017; Ong et al., 2021), tourism (Akhtar et al., 2021; Tussyadiah et al., 2018), retailing (Bonetti et al., 2018), and sports (Capasa et al., 2022). As for studies analysing XR in the fashion industry, some scholars have focused on a literature review about how fashion companies implement these technologies. Some studies that do this research are Boardman et al.'s (2020) study on AR and VR in the fashion industry; Goel et al.'s (2022) research on the apparel industry; Joy et al.'s (2022) study on luxury fashion; and Silvestri's (2020) study on how artificial intelligence and XR will affect the fashion industry. The few studies that discuss XR in the fashion industry examine its application in virtual fashion XR-commerce (Morotti et al., 2022) and virtual clothing (Mohamed Issak & Jamaleddine, 2022). All the research mentioned above shares the lack of academic literature outside China and the USA, especially on consumer behaviour and the intention to use these technologies. Furthermore, there are no studies that focus on fast fashion.

In this line, previous research has not explored the antecedents and consequences of XR adoption intention by fast fashion consumers. To have a complete understanding XR, this research aims to analyse the impact that its adoption intention has on customer engagement (Boardman et al., 2020; Nyadzayo et al., 2020), brand awareness and brand loyalty (Abou-Shouk & Soliman, 2021). This research will focus on European consumers below 35 years old, which are the main consumers of fast fashion products. The same age group is the people that use technology the most, including VR and AR devices (Joy et al., 2022; The Business Research Company, 2022). Hence, this study will contribute to the user acceptance literature by combining variables coming from UTAUT and constructs from consumer behaviour (customer engagement) and brand equity (brand awareness and brand loyalty). Additionally, the results of this research can provide valuable information to practitioners and society regarding XR technologies, which will be further explained in section number six.

This research addresses the following research questions:

(i) Do consumers accept the use of XR by fast fashion brands?

The question arises from the lack of studies on the subject and to discover whether consumers and fast fashion companies would be willing to invest in XR devices that are more expensive than the clothes sold in fast fashion. To complete the study, the following questions are:

- (ii) What impact does XR adoption intention have on consumers' behaviour?
- (iii) How does XR adoption intention affect brand loyalty and awareness?

These inquiries provide relevant information for brands willing to implement XR in their strategies. In order to answer these questions, the theory applied is the UTAUT, which offers an integrated model to predict technology adoption intention by consumers. It has four constructs: performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh et al., 2003). Regarding the effect on consumer behaviour and brand equity, it is necessary to analyse customer engagement (Nyadzayo et al., 2020; Vivek et al., 2012), and brand awareness and loyalty (Koivulehto, 2017; Thakur, 2019).

The present study is structured in the following sections: firstly, a theoretical framing will be provided with a detailed explanation of XR technology; fast fashion; the UTAUT theory with the consumer behaviour and brand equity constructs; and the meta-UTAUT as the alternative theory. Secondly, there will be an explanation about the procedures used for the literature review. The third section is about the research model and hypotheses. The the next following section will explain the methodology that has been applied to the quantitative research. Section six is subdivided into scholarly contributions and their implications for business and society. The seventh section is a chapter overview of the final thesis. The following section is the work plan for the upcoming days. Finally, the references are formatted according to APA 7th edition.

2. Theoretical Framing

This research applies XR acceptance in the fast fashion context. The UTAUT model will study the user's adoption intention (Venkatesh et al., 2003) with the addition of customer engagement, brand awareness and brand loyalty. Finally, the meta-UTAUT will be discussed as an alternative theoretical framework.

2.1 Extended Reality Technologies

Extended reality (XR) is a term that includes virtual reality (VR), augmented reality (AR) and mixed reality (MR). The development of these technologies has made possible the integration of virtual and real environments (Flavián et al., 2019; Mohamed Issak & Jamaleddine, 2022; Ong et al., 2021; Wagner & Cozmiuc, 2022). The major paper regarding the explanation of these technologies is the taxonomy of the mixed reality virtual displays by Milgram and Kishino (1994). They explained the reality-virtuality continuum, illustrated in figure 1, in which the terms real environment, augmented reality, augmented virtuality, virtual environment and mixed reality (MR) can be distinguished. Due to continuous technological progress, other scholars have provided different conceptualizations of each term (Flavián et al.,

2019; Speicher et al., 2019). Wedel et al. (2020) define VR as "a computer-generated simulation of a situation that incorporates the user, who perceives it via one or more senses (currently mostly vision, hearing and touch), and interacts with it in a manner that appears to be real" (p. 443). Whereas AR "modifies physical surroundings with superimposed virtual elements. This virtual layer, placed between the physical environments and the user, can add textual information, images, videos, or other virtual items to the person's viewing of physical environment" (Javornik, 2016, pp. 252-253). An additional feature counted by Carmigniani et al. (2011) is that AR is interactive. As for MR, defined by Milgram & Kishino (1994), it is a mix between AR and VR, so it lies between the real environment and the virtual environment, the two extremes of the virtuality continuum (figure 1). But as discussed above, technologies have been developed and their definitions have evolved with them (Liberatore & Wagner, 2021; Speicher et al., 2019). Although the terms augmented reality (AR) and mixed reality (MR) are sometimes used interchangeably, some authors make the distinction that MR allows interaction between real-world and virtual information (Liberatore & Wagner, 2021). Liberatore and Wagner Liberatore and Wagner created a list of characteristics of Parveau and Adda's (2018) MR definition: "(1) It consists of both real and virtual contents and allows data contextualization; (2) the digital content is required to be interactive in real time; (3) the content needs to be spatially mapped and correlated with the 3D space" (Liberatore & Wagner, 2021, p. 774). The MR can cause misunderstandings and there is no single definition (Speicher et al., 2019), thus, for the present study, we will use Parveau and Adda's (2018) conceptualisation, which is the most detailed.

Figure 1. Virtuality Continuum (Milgram & Kishino, 1994)



These XR technologies use different types of software and hardware, but they share three main features: immersion, presence and interaction (Cipresso et al., 2018; Ong et al., 2021; Silvestri, 2020; Yeung et al., 2021). *Immersion* means the perception of physical existence within the extended reality environment (Cipresso et al., 2018; Ong et al., 2021). *Presence* is the perception of "being there" or being connected to an environment. *Interaction* is the ability to act and receive a reaction within the environment (Ong et al., 2021; Yeung et al., 2021).

al., 2021). For a better understanding, the three features are going to be explained in detail. Marfia and Mateucci developed the *immersion* concept:

A continuous environment where a person may freely move and look around; consistent elements that a user may understand in terms of size, color and interaction patterns; an interactive scene where objects respond to the delivered stimuli, providing physical feedback (e.g., haptic interfaces) when, for example, touched; a coherent plot, which may support the development of user engagement. (2018, p. 17)

The term *presence* depends on the user's subjective perception while using the technology. Overall, presence suggests that a person is fully and intensely engaged in an activity. Therefore, a higher degree of immersion implies a higher degree of presence (Liberatore & Wagner, 2021). Presence in VR is clear, as it is the illusion of being within a virtual world (Silvestri, 2020). As for AR, the presence depends on the seamless integration of the virtual content with the real environment. Thus, AR technology must be sufficiently developed to integrate real and virtual content to generate a perceptual-unified environment (Steptoe et al., 2014). Finally, a detailed conceptualization of interaction is found in Mütterlein's (2018) study about presence, immersion and interaction in VR, which employs Steuter's definition of interaction: "refers to the degree to which users of a medium can influence the form or content of the mediated environment" (1992, p. 80). Although this definition was applied to a study focused on VR, it can also be expanded to AR and MR technologies. Further studies have completed this definition by establishing that interactivity is a subjective perception by users (Mütterlein, 2018; Yim et al., 2017). Hence, immersion, presence and interaction are the three characteristics that help to establish common features between XR technologies and are crucial in the present research to analyse the acceptance and intention of use.

Scholars that have analysed XR technologies and the fashion world tend to focus only on AR or VR (Flavián et al., 2019; Goel et al., 2022). However, when it is relating to the consumer there is a key point which is the experience offered to customers (Silvestri, 2020). XR technologies offer the possibility for the consumers to interact and experience directly while they are in the physical store or browsing the online shop (Bousba & Arya, 2022). Fashion application examples include virtual try-on (Kim et al., 2017), showrooms, catwalks (Silvestri, 2020), shops, virtual assitants or games (Dwivedi et al., 2022; Joy et al., 2022). These technologies are appealing to fashion brands as they can offer aesthetic experiences thanks to their immersion, presence and interaction features (Marfia & Matteucci, 2018; Silvestri, 2020). The aesthetic experience involves how we perceive the environment through the senses (Silvestri, 2020), therefore aesthetic is a reason that fashion brands use XR technologies (Hsiao, 2017; Mohamed Issak & Jamaleddine, 2022). Moreover, it should be considered that Covid-19 has played an important role to accelerate the incorporation and development of XR within the fashion industry. Due to the lockdown, all fashion stores and events stopped. For this reason, XR's interest increased in order to offer a different consumer experience even if the physical platforms were unavailable to operate (Dwivedi et al., 2022; Silvestri, 2020).

Nowadays, the metaverse has become a trend and a new reason why fashion companies are using XR technologies. Even though it is still in its early development stages, it has already made an impact on work, leisure and social interaction (Dwivedi et al., 2022; Wagner & Cozmiuc, 2022). The metaverse definition is not clear yet, and it depends on the perception and purpose employed (Dwivedi et al., 2022), but it involves the use of XR (Mystakidis, 2022). Joy et al.'s (2022) research on metaverse and luxury fashion brands set the commonalities that metaverse applications have: a social space; a space where one inhabits and interacts with; and a space that enables one to own and create virtual properties. They also included a definition regarding what is currently known about the metaverse: "a place where predominantly young consumers develop online lives, with avatars who can move, speak, and be customized to look in whatever way their creators wish" (Joy et al., 2022, p. 340). This definition helps to establish a link between XR technology users and fast fashion consumers. The profile of fast fashion consumers and digital devices is the youth population. Fast fashion companies target women below 30 years old (Norris, 2022). Generally, young people have lower incomes, thus they purchase affordable clothing offered by the industry (Glennon, 2020; The Business Research Company, 2022). Young people are the ones who use technology the most, who develop their online life through social networks or by creating avatars in virtual worlds. Data on VR and AR devices in 2018 indicated that the users' age group of these devices was 16-35 years old (Joy et al., 2022; The Business Research Company, 2022).

Examples of major fast fashion brands that have ventured into XR include Zara, H&M, Topshop and River Island (Boardman et al., 2020; H&M Group, 2022). In 2018, Zara used AR through its app to show digital models wearing certain garments and the customer could buy them through the app (Spanke, 2020). Zara has also entered the metaverse world by launching an exclusive collection with the South Korean label Ader Error for the Zepeto platform. The avatars could dress in clothes that can be found in physical Zara stores (Rodriguez Sanchez & Garcia-Badell, 2023). H&M has used XR to display events within the metaverse or to create virtual showrooms (H&M Group, 2022). Topshop was among the pioneer in using mobiles and VR headsets to provide customers with catwalk visuals at the London Fashion Week in 2014. Although it should be noted that the use of this technology was not interactive, as it was only a visualisation through VR devices (Farah et al., 2019). River Island utilised AR filters at London Fashion Week as well (Boardman et al., 2020). Luxury fashion brands such as Gucci, Burberry and Louis Vuitton are better known for their use of XR technologies (Bousba & Arya, 2022; Dwivedi et al., 2022). This is the case with Farfetch, a luxury marketplace, that has used in-store MR technologies to improve its customer experience. Through holograms and magic mirror devices, customers could customize their clothes while they were superimposed on the real environment (Chang, 2022). Focusing only on digital fashion brands, DressX is known for creating digital clothing. Thanks to its experience several brands have collaborated with this company to create virtual clothing. (Joy et al., 2022; Warner, 2022).

2.2 Fast fashion

The leading brands in fast fashion are Zara (Inditex), H&M Group, Uniqlo (Fast Retailing), Gap, Forever 21, Mango, Esprit, Primark, New Look, and River Island (The Business Research Company, 2022). These brands have characterised fast fashion because of their short life product cycle, multiple collection launches per year, adaptability to trends, volatile and unpredictable demand, impulsive consumer purchasing, competitive prices, and global supply sources (Mehrjoo & Pasek, 2016). Fast fashion profits rely on massive clothing production to sell it at low prices to conventional consumers (Bonilla et al., 2019; Hall, 2018). Fast fashion designs are historically adopted from fashion shows and catwalks and reinterpreted to offer them to consumers at affordable prices (Bhardwaj & Fairhurst, 2010). Moreover, thanks to technology, retailers can predict future trends by using real-time data (Silvestri, 2020; Spanke, 2020). As a result of technological advancements that have altered how customers buy and think, the fast fashion sector has been impacted by new forms of consumption (del Olmo Arriaga et al., 2017). For this reason, XR technologies have great potential within this industry.

2.3 Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT theory, developed by Venkatesh et al. (2003), proposes an explanation of the factors determining the behavioural intention to use a technological application. In order to predict the consumers' future intentions, this theory applies four constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). These constructs are a simplification from eight different research frameworks. The main reference framework is the Technology Acceptance Model (TAM), but UTAUT has the advantage of explaining 70% of the technology adoption, compared to the previous models that explain only 40% (Venkatesh et al., 2003). The present research applies the UTAUT to indicate the factors influencing the adoption intention of XR technologies. From this starting point, this study expects that XR's adoption will have two outcomes: behavioural intention and customer engagement. The latter is also an antecedent of brand awareness and brand loyalty (Abou-Shouk & Soliman, 2021). Hence, this research aims to predict the antecedents and consequences of XR's adoption within the fast fashion context.

This paragraph intends to provide the definitions for the four UTAUT constructs. *Performance expectancy* (PE) refers to an "individual who believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003, p. 447). *Effort expectancy* (EE) is the "ease associated with the use of the system" (Venkatesh et al., 2003, p. 450). This construct assesses if customers might need certain knowledge and skills due to the specific nature of XR technologies (Roy et al., 2021). The third construct is *social influence* (SI), which makes references when "an individual perceives that important others believe he or she should use the new system" (Venkatesh et al., 2003). This construct is related to how people believe others will consider them as a result of having employed the technology (Venkatesh et al., 2003). Finally, *facilitating conditions* (FC) are "the degree to which an individual believes that an organisational and technical infrastructure exists to support the use of the system" (Venkatesh et al., 2003, p. 453).

2.3 Customer engagement

Customer engagement is paramount to building strong customer relationships (Vivek et al., 2012). Customer engagement is considered a collection of the methods that customers employ to interact with the business in ways that go beyond merely making purchases (Brodie, Jaakl, Roy). From the point of view of the customers, they invest their time, money, and effort

towards customer engagement (Van Doorn et al., 2010). An additional definition of customer engagement is "customers' behavioural manifestations towards a brand or firm, beyond purchase, resulting from motivational drivers" (Van Doorn et al., 2010, p. 253). For this reason, companies decide to invest in interactive technology to improve customer engagement (Abou-Shouk & Soliman, 2021; Rather & Camilleri, 2019; Roy et al., 2021). For this current study, customer engagement is an outcome of XR technologies adoption.

2.3.1 Brand loyalty

Brand loyalty is a concept that goes beyond simply making purchases. Loyalty can be conceptualized as "the attitudinal relationship with the brand that may drive a customer's choice of behaviours" (Van Doorn et al., 2010, p. 254). Customers' social interaction with a service has a significant positive impact on their loyalty (Hassan et al., 2019; Jang et al., 2018). Additionally, previous studies have set that customer satisfaction is a key determinant of brand loyalty (Rather & Camilleri, 2019). For this research, customer engagement is an antecedent of brand loyalty.

2.3.2 Brand awareness

Brand awareness describes a customer's ability to purchase or recall that a brand belongs to a specific category or condition (Sukma et al., 2022). From the point of view of the business, brand awareness is about brand power to be remembered by consumers. To create effective brand awareness, companies need to generate more sales and events. To be memorable, buyers need a stimulus to emerge brand awareness (Aaker, 1991). The brand name is not only the single feature necessary to recall but also symbols, logos, colours, etc. (Sukma et al., 2022). Customer engagement is considered the basis of brand awareness and it is used to increase brand awareness among consumers (Abou-Shouk & Soliman, 2021; Samala et al., 2019). Brand awareness is connected to brand loyalty since both are part of brand equity (Sasmita & Mohd Suki, 2015). Previous studies have demonstrated that brand awareness impacts significantly and positively brand loyalty (Abou-Shouk & Soliman, 2021; Hsu & Chen, 2018). Therefore, in this present study, customer engagement is an antecedent of brand awareness and the latter is affecting fast fashion's brand loyalty.

2.4 Alternative theory: Meta-UTAUT

Meta-UTAUT is an alternative theory to the UTAUT model to understand the acceptance, usage and behaviour towards technology (Dwivedi et al., 2020). Dwivedi et al.

(2019) developed the meta-UTAUT model that sets the four original UTAUT constructors into two groups. The first group is *technology attributes* which encompass performance expectancy and effort expectancy constructs; the second group is *contextual factors* which involve social influence and facilitating conditions constructs. This theoretical model can help to determine if technology attributes and contextual factors can influence customer engagement towards XR technology. Moreover, based on Dwivedi et al. (2020) propositions, this theory assesses the role of customers' attitudes and behavioural intentions towards XR technologies in influencing customer engagement.

Customers' attitude is considered a partial mediator between the four UTAUT constructs and behavioural intention (Dwivedi et al., 2019). Adding attitude to the UTAUT is based on the theory of reasoned action and the theory of planned behaviour. An individual's attitude may be shaped by technological capabilities and contextual factors (Roy et al., 2018; Vahdat et al., 2021). Hence, it is expected that customers' attitudes regarding XR technologies will influence them to engage in behaviour towards XR. Additionally, it has been identified the influence of behavioural intention on actual behaviour (Bagozzi & Yi, 1989). Customers' attitude is not enough to encourage customers to invest their resources (time, money, and effort) to reach customer engagement (Roy et al., 2021). Thus, an individual's behavioural intention drives individual behaviour, which in turn, it is a function of an individual's attitude towards the behaviour (Dwivedi et al., 2020).

3. Literature Review

The literature research has been conducted through online research. Several databases have been used but the followings are the main ones: Google Scholar, ScienceDirect, JSTOR, Elsevier, ResearchGate, MDPI, Emerald Group and PubMed. As it is a new topic, some online articles from non-academic journals have been used: Gartner, The Research Business Company, Investera and H&M website. The queries employed different keywords with AND / OR conjunction: "Extended Reality", "Virtual Reality", "Augmented Reality", "Mixed Reality", "Consumer Behaviour", "Customer engagement", "Brand equity", "Brand awareness", "Brand loyalty", "Fast fashion", "Fashion", "UTAUT", and "TAM". There were no exclusion criteria for the research. Table 1 summarises the main references used in this research.

Table 1. Literature review

	Reference	Content
1	Silvestri, B. (2020). The Future of Fashion: How the Quest for Digitization and the Use of Artificial Intelligence and Extended Reality Will Reshape the Fashion Industry After COVID-19.	This paper aims to analyse how XR and artificial intelligence are influencing the fashion industry. These technologies are analysed with practical examples of what has been done in the industry, from a perspective based on the Covid-19 challenges. Results indicate that AR, VR and AI have the potential to become soon the norm in the fashion media and technology ecosystem, reinforcing the digitization process of the industry.
2	Joy, A., Zhu, Y., Peña, C., & Brouard, M. (2022). Digital future of luxury brands: Metaverse, digital fashion, and non-fungible tokens.	This research investigates how new technologies affect the fashion industry. Through practical examples of luxury brands, this article has theorized the trend of the metaverse, digital fashion, and non-fungible tokens. It then proposes future research questions for scholars regarding the impact of this topic on consumer behaviour, and business strategies, among others.
3	Goel, P., Mahadevan, K., & Punjani, K. K. (2022). Augmented and virtual reality in apparel industry: A bibliometric review and future research agenda.	The research purpose is to synthesize the literature on AR and VR in the apparel industry using bibliometric and network visualization techniques. The bibliometric analysis reveals the significant interest in this research domain and the prevalence of articles from China and the USA. Moreover, the findings show an existing gap in the literature regarding consumers' adoption behaviour.
4	Boardman, R., Henninger, C., & Zhu, A. (2020). Augmented Reality and Virtual Reality: New Drivers for Fashion Retail? (pp. 155–172).	This research focuses on AR and VR within the fashion industry. The TAM is used to evaluate the perceived usefulness and ease of use of AR and VR from a consumer perspective, regarding current fashion examples. It highlights further research about the impact of these technologies on consumer behaviour.
5	Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro- Navarrete, S., Giannakis, M., Al- Debei, M. M., Dennehy, D., Metri, B., Buhalis, D., Cheung, C. M. K., Conboy, K., Doyle, R., Dubey, R., Dutot, V., Felix, R., Goyal, D. P., Gustafsson, A., Hinsch, C., Jebabli, I., Wamba, S. F. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on	This study analyses the different metaverse applications in several areas (such as marketing) by integrating the instructed narrative and multi- perspective approach from experts with varied disciplinary backgrounds on many aspects of the metaverse and its impact. The paper proposes a research agenda about user engagement in the metaverse.

	Reference	Content
	emerging challenges, opportunities, and agenda for research, practice and policy.	
6	Milgram, P., & Kishino, F. (1994). A Taxonomy of Mixed Reality Visual Displays.	This study explains the taxonomy of the classification of Mixed Reality. It uses a literature review through primarily non-exhaustive examples of existing display systems in which real objects and virtual objects are exhibited together. The paper proposes a framework where essential factors can be distinguished between the following three dimensions: Extent of World Knowledge, Reproduction Fidelity, and Extent of Presence Metaphor.
7	Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2019). The impact of virtual, augmented and mixed reality technologies on the customer experience.	This academic article explores VR, AR and MR concepts and it integrates technological (embodiment), psychological (presence), and behavioural (interactivity) perspectives. Firstly, this research reviews previous proposals and clarifies some terminological misconceptions to establish clear limits and standardize the use of the terms describing the different realities. Secondly, it integrates different disciplines related to Information and Communication Technologies and customer experience (technological, psychological and behavioural). A new taxonomy of technologies is proposed (the "EPI Cube") and how different technologies in the EPI Cube can affect customer experiences along the purchase journey.
8	Liberatore, M. J., & Wagner, W. P. (2021). Virtual, mixed, and augmented reality: A systematic review for immersive systems research.	The study conducts a systematic review of the literature that addresses the performance of immersive systems (VR, AR, and MR). Previously, it was necessary to determine the three key aspects of the immersive systems: immersion, interaction and presence. It assesses those applications where experiments, tests, or clinical trials have been performed to evaluate the

9 Abou-Shouk, M., & Soliman, M. (2021). The impact of gamification

This research uses the UTAUT to examine the antecedents and consequences of gamification's

research agenda.

suggested application. This research addresses studies that compared one or more immersive systems and covers a wide variety of application areas. The results identify those applications that have been successfully tested and propose a

	Reference	Content
	adoption intention on brand awareness and loyalty in tourism: The mediating effect of customer engagement.	adoption intention by tourist organisations and to assess the mediation effect of customer engagement. Through a structural equation modelling for data analysis, the results show that tourism organisations have positive intentions to adopt gamification to increase customer engagement and build brand awareness and loyalty for travel destinations.
10	Bousba, Y., & Arya, V. (2022). Let's connect in metaverse. Brand's new destination to increase consumers' affective brand engagement & their satisfaction and advocacy.	This article examines the antecedents (novelty, interactivity and vividness) of a brand's gamification marketing activities in the Metaverse and the impact on consumers' affective brand engagement. Also, this study explores the consumers' anticipated satisfaction and brand advocacy in the Metaverse. According to the research, brands that deploy gamification-based marketing initiatives in the metaverse can improve consumers' affective brand engagement and enhance their virtual brand experience.

4. Research Model and Hypotheses

This section develops the hypotheses and the proposed research model. The hypotheses are based on previous theories and adapted to the present research. Some of these hypotheses have been modified to better adapt the model to the current research. Starting from studies related to the UTAUT, the first construct is Performance Expectancy (PE). XR use convergence networks to provide users with a vivid and immersive media experience. Consumers can interact quickly to a degree similar to face-to-face situations. When XR users can understand information accurately, they can remember the information better and make more accurate decisions about performing tasks (Lee & Kim, 2022). In the present research framework, performance expectancy is the degree to which an individual believes that XR technologies will lead to achieving gains. This construct is a strong predictor of behavioural intention (Escobar-Rodríguez & Carvajal-Trujillo, 2014; Venkatesh et al., 2003). Thus, the hypothesis presented is:

H1. XR's performance expectancy is positively affecting fast fashion consumers' intention to adopt XR technologies.

The second construct is Effort Expectancy (EE). XR helps users enjoy and interact with digital items more easily, so the communication between people and computers is improved. As a result, consumers do not require much information before using them. There are significant causal associations between EE and technology adoption and performance expectancy (Abou-Shouk & Soliman, 2021; Venkatesh et al., 2003). In this research, effort expectancy refers to the ease and convenience that consumers feel while using XR. The direct relationship between EE and PE means that XR technology is perceived as more beneficial. Technological users weigh the effort they consume to comprehend the new technology against the benefits they would gain from adoption (Davis et al., 1989). There are two hypotheses proposed:

H2. XR's effort expectancy is positively affecting fast fashion consumers' intention to adopt XR technologies.

H3. XR's effort expectancy has a positive influence on XR's performance expectancy.

The following construct is Social Influence (SI), which refers to whether people who are meaningful to the user (family, close friends, etc.) (Juaneda-Ayensa et al., 2016) believe they should use XR within a fashion context. Young generations are used to technology, they communicate and socialize with friends on online platforms, or even buy and sell through e-commerce. Thus, the user's immediate circle is accustomed to the use of the latest technologies to interact with digital objects. Users' technology adoption is significantly influenced by SI (Eisingerich et al., 2019). Even more, social influence has an influential impact on behavioural intention when technology adoption is in its early stages, as is the case of XR technologies (Chen et al., 2021).

H4. Social influence is significantly influencing fast fashion consumers' intention to adopt XR technologies.

The fourth construct is Facilitating Conditions (FC), which are related to available resources and support to perform the behaviour (Abou-Shouk & Soliman, 2021; Venkatesh et al., 2003). Due to the Covid-19 lockdown, the demand for non-face-to-face activities accelerated the use and development of XR technologies. Nowadays, most young people have devices that support XR, such as smartphones or laptops. In this study, facilitating conditions refer to the availability of XR technology that facilitates its use.

H5. Facilitating conditions are significantly influencing fast fashion consumers' intention to adopt XR technologies.

Previous studies agree that adoption intention is a positive determinant of behavioural intention (Venkatesh et al., 2003, 2012). Moreover, scholars agree that the main consequence of technology adoption intention is to foster effective customer participation (Abou-Shouk & Soliman, 2021). Technology adoption intention is a significant medium to facilitate customer engagement (Eisingerich et al., 2019). XR can be used as a tool for customer engagement, especially for marketing applications and social interaction. Based on the previous discussion, the following hypotheses are proposed:

H6. XR's adoption intention by fast fashion consumers has a significant positive impact on behavioural intention towards XR technologies.

H7. XR's adoption intention by fast fashion consumers has a significant positive impact on customer engagement with fast fashion brands.

It has been observed in previous studies, that customer engagement has a significant impact on brand awareness and brand loyalty, as it works as an antecedent (Abou-Shouk & Soliman, 2021; Koivulehto, 2017). According to Vivek et al. (2012), customer engagement is a mediator between customer participation and brand loyalty. Moreover, some scholars have found that customer engagement is a mediator between digital content marketing activities and brand loyalty (Fernandes & Esteves, 2016). Regarding the relationship between brand awareness and brand loyalty, they are part of brand equity and they are interconnected. Brand awareness is a fundamental source of brand knowledge and a previous step toward brand loyalty (Hsu & Chen, 2018). Hence, brand loyalty is significantly and positively influenced by brand awareness (Xu et al., 2016). Based on the above-mentioned the following hypotheses are proposed:

H8. Customer engagement has a significant positive influence on fast fashion companies' brand awareness.

H9. Customer engagement has a significant positive impact on fast fashion companies' brand loyalty.

H10. Fast fashion companies' brand awareness has a significant positive impact on fast fashion companies' brand loyalty.

As a result of the theory and the hypothesis presented, the research model is composed of the four UTAUT constructs and their outputs. With the addition of customer engagement, brand loyalty and brand awareness. The following figure illustrates the relationships:

Figure 2. Proposed Reasearch Model



5. Methodology

The methodology selected to perform this research is the quantitative approach. The quantitative analysis is suitable to collect hard facts and figures to draw a general conclusion. Moreover, the UTAUT model requires to be validated through statistical analysis. The research will be performed through an online survey. The sample will be composed of fast fashion consumers living in a European country. The age group selected is people between 18 - 35 years old because it is the main target for fast fashion and XR devices (Joy et al., 2022; Norris, 2022; The Business Research Company, 2022). The respondents do not need to have used or known XR technology since the study aims to research consumers' intention to use XR and not their satisfaction with it.

The questionnaire is going to be designed with the software Sphinx, based on the research framework and hypotheses outlined above. For the data collection, the survey will be distributed in English, Spanish and French to assure a higher response rate and sample representativeness, as well as the validity of the answers. The final questionnaire will be spread among individuals through social media channels, universities, survey platforms (e.g. EUSurvey), word of mouth and the snowball technique. The survey will have a brief explanation due to the XR's novelty in fashion and the potential lack of knowledge among the respondents. It will be descriptions and illustrated examples of XR (VR, AR and MR) applied in a fashion context (e.g. digital collection from Zara). Thus, respondents will understand the technologies and applications to provide more reliable data.

After the explanations, the first section will collect the demographic data. Also, there will be a filter question regarding whether they have purchased from a fast fashion brand. Then, the second section will focus on the constructs and the mediators presented above. It will be structured as follows:

- 1- Technology acceptance
- 2- Customer engagement
- 3- Brand awareness
- 4- Brand loyalty

All questions will be measured through a 5-point Likert scale varying from "strongly disagree" (1) to "strongly agree" (5). To assure the validity of each measure, items for the chosen constructs presented in the research model are retrieved from previous studies. The following table will show the adaptation into the specific context of XR within fast fashion.

Construct	Original Items	Adapted Items	
Performance	PE1. I would find mobile Internet	PE1. I would find the XR useful in	
Expectancy	useful in my daily life.	my shopping journey.	
(PE)	PE2. Using mobile Internet increases	PE2. Using XR would increase	
	my chance of achieving things that my chance of achieving		
	are important to me. that are important to me.		
	PE3. Using mobile Internet helps me	PE3. Using XR helps me	
	accomplish things more quickly.	accomplish things more quickly.	

Table 2. Constructs and respective items composing the model

	PE4. Using XR increases my	PE4. Using XR would increase	
	productivity	my productivity during my	
	(Venkatesh et al., 2012)	shopping journey.	
Effort	EE1. Learning how to use mobile	EE1. Learning how to use XR	
Expectancy	Internet is easy for me.	would be easy for me.	
(EE)	EE2. My interaction with mobile	EE2. My interaction with XR	
	Internet is clear and understandable.	would be clear and	
	EE3. I find mobile Internet easy to	understandable.	
	use.	EE3. I would find XR easy to use.	
	EE4. It is easy for me to become	EE4. It would be easy for me to	
	skilful at using mobile Internet	become skilful at using XR.	
	(Venkatesh et al., 2012)		
Social	SI1: I assume that people whose	SI1. I assume that people whose	
Influence (SI)	opinions I value would prefer that I	opinions I value would prefer that	
	use a conditionally automated car.	I use XR.	
	SI2: I expect that people who	SI2. I expect that people who	
	influence my behaviour think that I	influence my behaviour think that	
	should use a conditionally automated	I should use XR.	
	car.	SI3. I expect that people who are	
	SI3: I expect that people who are	important to me think that I should	
	important to me think that I should	use XR.	
	use a conditionally automated car.	SI4: I would recommend XR to	
	SI4: I would recommend a	others.	
	conditionally automated car to others.		
	(Nordhoff et al., 2020)		
Facilitating	FC1. I have the resources necessary to	FC1. I could acquire the necessary	
Conditions	use mobile Internet.	knowledge to use XR.	
(FC)	FC2. I have the knowledge necessary	FC2. I would expect that XR is	
	to use mobile Internet.	compatible with other devices I	
	FC3. Mobile Internet is compatible	use.	
	with other technologies I use.	FC3. I could have the resources	
		necessary to use XR.	

	FC4. I can get help from others when	FC4. I would be able to get help	
	I have difficulties using mobile	from others when I have	
	Internet.	difficulties using XR.	
	(Venkatesh et al., 2012)		
Behavioural	BI1: I intend to use a conditionally	BI1. I intend to use XR in the	
Intention (BI)	automated car in the future	future.	
	BI2: Assuming that I had access to a	BI2. Assuming that I had access to	
	conditionally automated car, I predict	XR, I predict that I would use it	
	that I would use it	BI3. I would use XR during my	
	BI3: I plan to use a conditionally	fast fashion shopping.	
	automated car in adverse weather	BI4. I plan to buy a XR	
	conditions such as during heavy rain	technology in the future.	
	or fog, and in darkness		
	BI4. I would use a conditionally		
	automated car during my everyday		
	trips.		
	BI5: I plan to buy a conditionally		
	automated car once it is available		
	(Nordhoff et al., 2020)		
Customer	CE1. Using game application will	CE1. Using XR would increase	
engagement	increase customers'	my interactivity with the fast	
(CE)	interactivity/engagement with brand.	fashion brand.	
	CE2. Customers will like to actively	CE2. I would like to actively	
	participating in brand community	participate in brand community	
	discussion/activities	discussions/activities.	
	CE3. Customers will thoroughly	CE3. I would thoroughly enjoy	
	enjoy exchanging ideas with other	exchanging ideas with other	
	people in the brand community.	people within the brand	
	CE4. Customers will be passionate	community.	
	about our brand	CE4. I would be passionate about	
	(Abou-Shouk & Soliman, 2021)	fast fashion brand.	

Brand	BA1. Customers would like to learn	BA1. I would like to learn more
awareness	more about our brand.	about brands that use XR.
(BA)	BA2. Customers will pay a lot of	BA2. I would pay a lot of
	attention to anything about our brand.	attention to anything about brands
	BA3. Anything related to our brand	that use XR
	will grab the attention of customers.	BA3. Anything related to brands
	BA4. I concentrate a lot on this brand.	that use XR would grab my
	BA5.Customer Sharing of their	attention.
	experience and recalling memories	BA4. I would concentrate a lot on
	will help increase brand awareness.	brands that use XR.
	(Abou-Shouk & Soliman, 2021)	
Brand loyalty	BL1. Using game application will	BL1 Using XR would increase
(BL)	increase customer commitment to our	my commitment to the brand.
	brand.	BL2 I would intend to keep
	BL2. Customers would intend to keep	using brands that use XR.
	using our brand	BL3 I would speak positively
	BL3. Customers will speak positively	about brands that use XR.
	about our brand.	BL4 I would recommend
	BL4. Customers will recommend our	brands that use XR to others.
	brand to others.	
	(Abou-Shouk & Soliman, 2021)	

For the data analysis procedure, the Structural Equation Model (SEM) is going to be used to evaluate the proposed research framework and find the interrelations among constructs. In order to determine the reliability of the measurement model and related constructs, SmartPLS is going to be adopted. It is a software used for Partial Least Squares SEM, which is the most used in studies focused on technology research analysed through the UTAUT.

6. Expected Contributions

6.1 Scholarly Contributions

The current study provides theoretical and managerial implications for XR technology and fashion literature that can be applied to fast fashion strategies. This work assesses the intention to use XR by fast fashion consumers and how customers perceive and value brands that use XR. The study contributes to the scholarly discussion by using the Unified Theory of Acceptance and Use of Technology (UTAUT). Furthermore, it adds consumer behaviour constructs, such as customer engagement, brand awareness and brand loyalty, which are relevant as brand equity indicators (Abou-Shouk & Soliman, 2021; Boardman et al., 2020; Ishaq, 2012; Koivulehto, 2017; Nyadzayo et al., 2020).

6.2 Implications for Business and Society

This research advises that fashion managers will need to innovate by using XR technologies in order to give customers a more engaging shopping experience, which will become a critical aspect necessary to withstand the fast and competitive environment (Orús et al., 2021). A better understanding of the subject will also allow fast fashion companies to improve their omnichannel strategies and use XR on social platforms to engage with their customers (Goel et al., 2022). The research also has some important social contributions because XR changes the way people relate to their environment. Indeed, several studies predict that XR applied to the metaverse will play an essential role in future fashion shopping (Bousba & Arya, 2022; Dwivedi et al., 2022; Joy et al., 2022; Silvestri, 2020). The metaverse is meant to be more realistic and egalitarian while allowing for more direct and physical relationships. Not only demographic barriers could be blurred but also social class barriers by offering cheaper prices for digital objects compared to their physical equivalent (Gartner, 2022; Investera, 2022).

7. Chapters Overview

Abstract List of Abbreviations List of Figures List of Tables

1. Introduction

- 2. Theoretical framing
 - 2.1 Extended Reality Technologies
 - 2.2 Fast Fashion
 - 2.3 Unified Theory of Acceptance and Use of Technology (UTAUT)
 - 2.4 Customer engagement
 - 2.4.1 Brand awareness
 - 2.4.2 Brand loyalty
- 3. Research Hypothesis and Research Model
 - 3.1 Literature Review Table
 - 3.2 Hypotheses
 - 3.3. Research Model
- 4. Methodology
- 5. Data Analysis and Results
- 6. Conclusion
 - 6.1 Main findings
 - 6.2 Contributions and limitations
- 7. References
- 8. Appendix

8. Work Plan

 Table 3. Work Plan Table

Time period	Activity	Stage
1 st September 2022 – 23 rd October 2022	Research and writing the Exposé	Done
23 rd October 2022	Exposé submission	Done

24 th October 2022 –	Questionnaire Design and translation	Done
30 th October 2022		
31 st October 2022 –	Questionnaire testing and improvements	_
6 th November 2022		
7 th November 2022 –	Data Collection	_
23 rd November 2022		
24 th November 2022 –	Data Analysis	_
17 th December 2022		
18 th December 2022 –	Final developing and reviewing the Thesis	_
12 th January 2023		
13 th January 2023	Thesis submission	-
17 th - 20 th January	Thesis defence	_
2023		-

9. References

Aaker, D. A. (1991). Managing Brand Equity: Capitalizing on the Value of a Brand Name.

- Abou-Shouk, M., & Soliman, M. (2021). The impact of gamification adoption intention on brand awareness and loyalty in tourism: The mediating effect of customer engagement.
 Journal of Destination Marketing & Management, 20, 100559.
 https://doi.org/10.1016/j.jdmm.2021.100559
- Akhtar, N., Khan, N., Mahroof Khan, M., Ashraf, S., Hashmi, M. S., Khan, M. M., & Hishan,
 S. S. (2021). Post-COVID 19 Tourism: Will Digital Tourism Replace Mass Tourism?
 Sustainability, 13(10), Article 10. https://doi.org/10.3390/su13105352
- Bagozzi, R. P., & Yi, Y. (1989). The Degree of Intention Formation as a Moderator of the Attitude-Behavior Relationship. Social Psychology Quarterly, 52(4), 266–279. https://doi.org/10.2307/2786991
- Bhardwaj, V., & Fairhurst, A. (2010). Fast fashion: Response to changes in the fashion industry. *The International Review of Retail, Distribution and Consumer Research*, 20(1), 165–173. https://doi.org/10.1080/09593960903498300

- Boardman, R., Henninger, C., & Zhu, A. (2020). Augmented Reality and Virtual Reality: New Drivers for Fashion Retail? (pp. 155–172). https://doi.org/10.1007/978-3-030-15483-7_9
- Bonetti, F., Warnaby, G., & Quinn, L. (2018). Augmented Reality and Virtual Reality in Physical and Online Retailing: A Review, Synthesis and Research Agenda. In T. Jung & M. C. tom Dieck (Eds.), *Augmented Reality and Virtual Reality: Empowering Human, Place and Business* (pp. 119–132). Springer International Publishing. https://doi.org/10.1007/978-3-319-64027-3_9
- Bonilla, M. D. R., del Olmo Arriaga, J. L., & Andreu, D. (2019). The interaction of Instagram followers in the fast fashion sector: The case of Hennes and Mauritz (H&M). *Journal of Global Fashion Marketing*, 10(4), 342–357. https://doi.org/10.1080/20932685.2019.1649168
- Bousba, Y., & Arya, V. (2022). Let's connect in metaverse. Brand's new destination to increase consumers' affective brand engagement & their satisfaction and advocacy. *Journal of Content, Community & Communication, 15*(8), 18. https://doi.org/10.31620/JCCC.06.22/19
- Capasa, L., Zulauf, K., & Wagner, R. (2022). Virtual Reality Experience of Mega Sports
 Events: A Technology Acceptance Study. Journal of Theoretical and Applied
 Electronic Commerce Research, 17(2), 686–703.
 https://doi.org/10.3390/jtaer17020036
- Carmigniani, J., Furht, B., Anisetti, M., Ceravolo, P., Damiani, E., & Ivkovic, M. (2011). Augmented reality technologies, systems and applications. *Multimedia Tools and Applications*, *51*(1), 341–377. https://doi.org/10.1007/s11042-010-0660-6
- Chang, V. (2022). *Hybrid Retail: Rethinking the Urban Public by Embracing the Digital Experience* [Thesis]. https://DalSpace.library.dal.ca//handle/10222/81894

- Chen, L., Rashidin, Md. S., Song, F., Wang, Y., Javed, S., & Wang, J. (2021). Determinants of Consumer's Purchase Intention on Fresh E-Commerce Platform: Perspective of UTAUT Model. *SAGE Open*, *11*(2), 21582440211027876. https://doi.org/10.1177/21582440211027875
- Cipresso, P., Giglioli, I. A. C., Raya, M. A., & Riva, G. (2018). The Past, Present, and Future of Virtual and Augmented Reality Research: A Network and Cluster Analysis of the Literature. *Frontiers in Psychology*, 9. https://www.frontiersin.org/articles/10.3389/fpsyg.2018.02086
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, 35(8), 982–1003.
- del Olmo Arriaga, J. L., Andreu Domingo, D., & Berlanga Silvente, V. (2017). Facebook in the low-cost fashion sector: The case of Primark. *Journal of Fashion Marketing and Management:* An International Journal, 21(4), 512–522. https://doi.org/10.1108/JFMM-08-2016-0069
- Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., Dennehy, D., Metri, B., Buhalis, D., Cheung, C. M. K., Conboy, K., Doyle, R., Dubey, R., Dutot, V., Felix, R., Goyal, D. P., Gustafsson, A., Hinsch, C., Jebabli, I., ... Wamba, S. F. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 66, 102542. https://doi.org/10.1016/j.ijinfomgt.2022.102542
- Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Reexamining the Unified Theory of Acceptance and Use of Technology (UTAUT):

Towards a Revised Theoretical Model. *Information Systems Frontiers*, 21(3), 719–734. https://doi.org/10.1007/s10796-017-9774-y

- Dwivedi, Y. K., Rana, N. P., Tamilmani, K., & Raman, R. (2020). A meta-analysis based modified unified theory of acceptance and use of technology (meta-UTAUT): A review of emerging literature. *Current Opinion in Psychology*, 36, 13–18. https://doi.org/10.1016/j.copsyc.2020.03.008
- Eisingerich, A. B., Marchand, A., Fritze, M. P., & Dong, L. (2019). Hook vs. hope: How to enhance customer engagement through gamification. *International Journal of Research in Marketing*, 36(2), 200–215. https://doi.org/10.1016/j.ijresmar.2019.02.003
- Escobar-Rodríguez, T., & Carvajal-Trujillo, E. (2014). Online purchasing tickets for low cost carriers: An application of the unified theory of acceptance and use of technology (UTAUT) model. *Tourism Management*, 43, 70–88. https://doi.org/10.1016/j.tourman.2014.01.017
- Faqih, K. M. S., & Jaradat, M.-I. R. M. (2021). Integrating TTF and UTAUT2 theories to investigate the adoption of augmented reality technology in education: Perspective from a developing country. *Technology in Society*, 67, 101787. https://doi.org/10.1016/j.techsoc.2021.101787
- Farah, M. F., Ramadan, Z. B., & Harb, D. H. (2019). The examination of virtual reality at the intersection of consumer experience, shopping journey and physical retailing. *Journal* of Retailing and Consumer Services, 48, 136–143. https://doi.org/10.1016/j.jretconser.2019.02.016
- Fernandes, T., & Esteves, F. (2016). Customer Engagement and Loyalty: A Comparative Study Between Service Contexts. Services Marketing Quarterly, 37(2), 125–139. https://doi.org/10.1080/15332969.2016.1154744

- Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2019). The impact of virtual, augmented and mixed reality technologies on the customer experience. *Journal of Business Research*, 100, 547–560. https://doi.org/10.1016/j.jbusres.2018.10.050
- Gartner. (2022). Gartner Predicts 25% of People Will Spend At Least One Hour Per Day in the Metaverse by 2026. Gartner. https://www.gartner.com/en/newsroom/pressreleases/2022-02-07-gartner-predicts-25-percent-of-people-will-spend-at-least-onehour-per-day-in-the-metaverse-by-2026
- Glennon, U. (2020). Consumer Awareness and Fast Fashion. Information on consumer perceptions of fashion retailers. https://www.grin.com/document/942994
- Goel, P., Mahadevan, K., & Punjani, K. K. (2022). Augmented and virtual reality in apparel industry: A bibliometric review and future research agenda. *Foresight*. https://doi.org/10.1108/FS-10-2021-0202
- Hall, J. (2018). Digital Kimono: Fast Fashion, Slow Fashion? *Fashion Theory*, 22(3), 283–307. https://doi.org/10.1080/1362704X.2017.1319175
- Hassan, L., Dias, A., & Hamari, J. (2019). How motivational feedback increases user's benefits and continued use: A study on gamification, quantified-self and social networking. *International Journal of Information Management*, 46, 151–162. https://doi.org/10.1016/j.ijinfomgt.2018.12.004
- H&M Group. (2022, April 25). A virtual reality at H&M Group. https://hmgroup.com/our-stories/a-virtual-reality-at-hm-group/
- Hsiao, K.-L. (2017). What drives smartwatch adoption intention? Comparing Apple and non-Apple watches. *Library Hi Tech*, 35(1), 186–206. https://doi.org/10.1108/LHT-09-2016-0105
- Hsu, C.-L., & Chen, M.-C. (2018). How does gamification improve user experience? An empirical investigation on the antecedences and consequences of user experience and

its mediating role. *Technological Forecasting and Social Change*, *132*, 118–129. https://doi.org/10.1016/j.techfore.2018.01.023

- Investera. (2022, March 3). The Future of E-Commerce in the Metaverse What you need to know | Investera | Investment Management Platform. https://investera.com/the-futureof-e-commerce-in-the-metaverse-what-you-need-to-know/
- Ishaq, I. M. (2012). Perceived value, service quality, corporate image and customer loyalty: Empirical assessment from Pakistan. Serbian Journal of Management, 7(1), 25–36. https://doi.org/10.5937/sjm1201025I
- Jang, S., Kitchen, P. J., & Kim, J. (2018). The effects of gamified customer benefits and characteristics on behavioral engagement and purchase: Evidence from mobile exercise application uses. *Journal of Business Research*, 92, 250–259. https://doi.org/10.1016/j.jbusres.2018.07.056
- Javornik, A. (2016). Augmented reality: Research agenda for studying the impact of its media characteristics on consumer behaviour. *Journal of Retailing and Consumer Services*, 30, 252–261. https://doi.org/10.1016/j.jretconser.2016.02.004
- Joy, A., Zhu, Y., Peña, C., & Brouard, M. (2022). Digital future of luxury brands: Metaverse, digital fashion, and non-fungible tokens. *Strategic Change*, 31(3), 337–343. https://doi.org/10.1002/jsc.2502
- Juaneda-Ayensa, E., Mosquera, A., & Sierra Murillo, Y. (2016). Omnichannel Customer
 Behavior: Key Drivers of Technology Acceptance and Use and Their Effects on
 Purchase Intention. *Frontiers in Psychology*, 7.
 https://www.frontiersin.org/articles/10.3389/fpsyg.2016.01117
- Kim, H.-Y., Lee, J. Y., Mun, J. M., & Johnson, K. K. P. (2017). Consumer adoption of smart in-store technology: Assessing the predictive value of attitude versus beliefs in the

technology acceptance model. *International Journal of Fashion Design, Technology and Education, 10*(1), 26–36. https://doi.org/10.1080/17543266.2016.1177737

- Koivulehto, E. I. (2017). Do social media marketing activities enhance customer equity? A case study of fast-fashion brand Zara. https://aaltodoc.aalto.fi:443/handle/123456789/26042
- Lee, U.-K., & Kim, H. (2022). UTAUT in Metaverse: An "Ifland" Case. Journal of Theoretical and Applied Electronic Commerce Research, 17(2), Article 2. https://doi.org/10.3390/jtaer17020032
- Li, L., Yu, F., Shi, D., Shi, J., Tian, Z., Yang, J., Wang, X., & Jiang, Q. (2017). Application of virtual reality technology in clinical medicine. *American Journal of Translational Research*, 9(9), 3867–3880.
- Liberatore, M. J., & Wagner, W. P. (2021). Virtual, mixed, and augmented reality: A systematic review for immersive systems research. *Virtual Reality*, 25(3), 773–799. https://doi.org/10.1007/s10055-020-00492-0
- Marfia, G., & Matteucci, G. (2018). Some remarks on aesthetics and computer science. *Studi* Di Estetica, 12, Article 12. http://journals.mimesisedizioni.it/index.php/studi-diestetica/article/view/625
- Mehrjoo, M., & Pasek, Z. J. (2016). Risk assessment for the supply chain of fast fashion apparel industry: A system dynamics framework. *International Journal of Production Research*, 54(1), 28–48. https://doi.org/10.1080/00207543.2014.997405
- Milgram, P., & Kishino, F. (1994). A Taxonomy of Mixed Reality Visual Displays. *IEICE TRANS. Inf. Syst*, 77, 1321–1329.
- Mohamed Issak, F. M., & Jamaleddine, G. (2022). Young adults' adoption to fashion brands use of extended reality technologies such as Virtual Clothing. http://urn.kb.se/resolve?urn=urn:nbn:se:hj:diva-56704

- Morotti, E., Stacchio, L., Donatiello, L., Roccetti, M., Tarabelli, J., & Marfia, G. (2022). Exploiting fashion x-commerce through the empowerment of voice in the fashion virtual reality arena. *Virtual Reality*, 26(3), 871–884. https://doi.org/10.1007/s10055-021-00602-6
- Mütterlein, J. (2018). The Three Pillars of Virtual Reality? Investigating the Roles of Immersion, Presence, and Interactivity. http://hdl.handle.net/10125/50061
- Mystakidis, S. (2022). Metaverse. *Encyclopedia*, 2(1), Article 1. https://doi.org/10.3390/encyclopedia2010031
- Niu, M. (2020). Application of intelligent virtual reality technology in Clothing virtual wear and color saturation after COVID-19 epidemic situation. *Journal of Intelligent* & Fuzzy Systems, 39(6), 8943–8951. https://doi.org/10.3233/JIFS-189292
- Nordhoff, S., Louw, T., Innamaa, S., Lehtonen, E., Beuster, A., Torrao, G., Bjorvatn, A., Kessel, T., Malin, F., Happee, R., & Merat, N. (2020). Using the UTAUT2 model to explain public acceptance of conditionally automated (L3) cars: A questionnaire study among 9,118 car drivers from eight European countries. *Transportation Research Part F: Traffic Psychology and Behaviour*, 74, 280–297. https://doi.org/10.1016/j.trf.2020.07.015
- Norris, O. J. (2022, January 10). The Age of Fast Fashion: How Consumer Behaviour Has Changed and How It's Impacting Our Environment. *AMPLYFI*. https://amplyfi.com/2022/01/10/the-age-of-fast-fashion/
- Nyadzayo, M. W., Johnson, L. W., & Rossi, M. (2020). Drivers and outcomes of brand engagement in self-concept for luxury fashion brands. *Journal of Fashion Marketing* and Management: An International Journal, 24(4), 589–609. https://doi.org/10.1108/JFMM-05-2018-0070

- Ong, C. W., Tan, M. C. J., Lam, M., & Koh, V. T. C. (2021). Applications of Extended Reality in Ophthalmology: Systematic Review. *Journal of Medical Internet Research*, 23(8), e24152. https://doi.org/10.2196/24152
- Orús, C., Ibáñez-Sánchez, S., & Flavián, C. (2021). Enhancing the customer experience with virtual and augmented reality: The impact of content and device type. *International Journal of Hospitality Management*, 98, 103019. https://doi.org/10.1016/j.ijhm.2021.103019
- Parveau, M., & Adda, M. (2018). 3iVClass: A new classification method for Virtual, Augmented and Mixed Realities. *Procedia Computer Science*, 141, 263–270. https://doi.org/10.1016/j.procs.2018.10.180
- Rana, S. (2021). A Review on Research During COVID 19 and Call for Research on Marketing
 During the Pandemic. *FIIB Business Review*, 10(4), 309–314.
 https://doi.org/10.1177/23197145211062431
- Rather, R. A., & Camilleri, M. A. (2019). The effects of service quality and consumer-brand value congruity on hospitality brand loyalty. *Anatolia*, 30(4), 547–559. https://doi.org/10.1080/13032917.2019.1650289
- Rodriguez Sanchez, M., & Garcia-Badell, G. (2023). Dressing the Metaverse. The Digital Strategies of Fashion Brands in the Virtual Universe. In A. C. Broega, J. Cunha, H. Carvalho, & B. Providência (Eds.), *Advances in Fashion and Design Research* (pp. 387–397). Springer International Publishing.
- Roy, S. K., Balaji, M. S., Quazi, A., & Quaddus, M. (2018). Predictors of customer acceptance of and resistance to smart technologies in the retail sector. *Journal of Retailing and Consumer Services*, 42, 147–160. https://doi.org/10.1016/j.jretconser.2018.02.005

- Roy, S. K., Singh, G., & Shabnam, S. (2021). Modelling Customer Engagement Behaviour in Smart Retailing: Australasian Journal of Information Systems, 25. https://doi.org/10.3127/ajis.v25i0.2967
- Samala, N., Singh, S., Nukhu, R., & Khetarpal, M. (2019). Investigating the role of participation and customer-engagement with tourism brands (CETB) on social media. *Academy of Marketing Studies Journal*, 23(1), 1–16.
- Sasmita, J., & Mohd Suki, N. (2015). Young consumers' insights on brand equity: Effects of brand association, brand loyalty, brand awareness, and brand image. *International Journal of Retail & Distribution Management*, 43(3), 276–292. https://doi.org/10.1108/IJRDM-02-2014-0024
- Silvestri, B. (2020). The Future of Fashion: How the Quest for Digitization and the Use of Artificial Intelligence and Extended Reality Will Reshape the Fashion Industry After COVID-19. *ZoneModa Journal*, *10*(2), Article 2. https://doi.org/10.6092/issn.2611-0563/11803
- Spanke, M. (2020). Augmented Reality (M. Spanke, Ed.). Springer International Publishing. https://doi.org/10.1007/978-3-030-36650-6_5
- Speicher, M., Hall, B. D., & Nebeling, M. (2019). What is Mixed Reality? Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems, 1–15. https://doi.org/10.1145/3290605.3300767
- Steptoe, W., Julier, S., & Steed, A. (2014). Presence and discernability in conventional and non-photorealistic immersive augmented reality. 2014 IEEE International Symposium on Mixed and Augmented Reality (ISMAR), 213–218. https://doi.org/10.1109/ISMAR.2014.6948430
- Steuer, J. (1992). Defining Virtual Reality: Dimensions Determining Telepresence. Journal of Communication, 42(4), 73–93. https://doi.org/10.1111/j.1460-2466.1992.tb00812.x

- Sukma, A. S., Prof. Dr. Ir. Ujang Sumarwan, M., & Prof. Dr. Mukhamad Najib, S. T. (2022).The effects of events, brand awareness, customer engagement on purchasing decisions:A literature review. *Accounting, Organization & Economics, 2*(1), Article 1.
- Thakur, R. (2019). The moderating role of customer engagement experiences in customer satisfaction–loyalty relationship. *European Journal of Marketing*, 53(7), 1278–1310. https://doi.org/10.1108/EJM-11-2017-0895
- The Business Research Company. (2022). Fast Fashion Global Market Report 2022 By Gender (Women's Wear, Men's Wear), By Age (Adults Wear, Teens Wear, Kids Wear, Other Ages), By Type (Pants, Coat, Skirt, Other Types) – Market Size, Trends, And Global Forecast 2022-2026. Fast Fashion Global Market Report 2022 – By Gender (Women's Wear, Men's Wear), By Age (Adults Wear, Teens Wear, Kids Wear, Other Ages), By Type (Pants, Coat, Skirt, Other Types) – Market Size, Trends, And Global Forecast 2022-2026. https://www.thebusinessresearchcompany.com/report/fastfashion-global-market-report
- Tussyadiah, I. P., Wang, D., Jung, T. H., & tom Dieck, M. C. (2018). Virtual reality, presence, and attitude change: Empirical evidence from tourism. *Tourism Management*, 66, 140– 154. https://doi.org/10.1016/j.tourman.2017.12.003
- Vahdat, A., Alizadeh, A., Quach, S., & Hamelin, N. (2021). Would you like to shop via mobile app technology? The technology acceptance model, social factors and purchase intention. *Australasian Marketing Journal*, 29(2), 187–197. https://doi.org/10.1016/j.ausmj.2020.01.002
- Van Doorn, J., Lemon, K. N., Mittal, V., Nass, S., Pick, D., Pirner, P., & Verhoef, P. C. (2010).
 Customer Engagement Behavior: Theoretical Foundations and Research Directions.
 Journal of Service Research, 13(3), 253–266.
 https://doi.org/10.1177/1094670510375599

- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, 27(3), 425–478. https://doi.org/10.2307/30036540
- Venkatesh, V., Thong, J., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, 36, 157–178. https://doi.org/10.2307/41410412
- Vivek, S. D., Beatty, S. E., & Morgan, R. M. (2012). Customer Engagement: Exploring Customer Relationships Beyond Purchase. *Journal of Marketing Theory and Practice*, 20(2), 122–146. https://doi.org/10.2753/MTP1069-6679200201
- Wagner, R., & Cozmiuc, D. (2022). Extended Reality in Marketing—A Multiple Case Study on Internet of Things Platforms. *Information*, 13(6), Article 6. https://doi.org/10.3390/info13060278
- Warner, D. S. (2022). The Metaverse with Chinese Characteristics: A Discussion of the Metaverse through the Lens of Confucianism and Daoism [University of Pittsburgh]. http://d-scholarship.pitt.edu/42461/
- Wedel, M., Bigné, E., & Zhang, J. (2020). Virtual and augmented reality: Advancing research in consumer marketing. *International Journal of Research in Marketing*, 37(3), 443– 465. https://doi.org/10.1016/j.ijresmar.2020.04.004
- Xu, F., Tian, F., Buhalis, D., Weber, J., & Zhang, H. (2016). Tourists as Mobile Gamers: Gamification for Tourism Marketing. *Journal of Travel & Tourism Marketing*, 33(8), 1124–1142. https://doi.org/10.1080/10548408.2015.1093999
- Yeung, A. W. K., Tosevska, A., Klager, E., Eibensteiner, F., Laxar, D., Stoyanov, J., Glisic,
 M., Zeiner, S., Kulnik, S. T., Crutzen, R., Kimberger, O., Kletecka-Pulker, M.,
 Atanasov, A. G., & Willschke, H. (2021). Virtual and Augmented Reality Applications

in Medicine: Analysis of the Scientific Literature. *Journal of Medical Internet Research*, 23(2), e25499. https://doi.org/10.2196/25499

Yim, M. Y.-C., Chu, S.-C., & Sauer, P. L. (2017). Is Augmented Reality Technology an Effective Tool for E-commerce? An Interactivity and Vividness Perspective. *Journal* of Interactive Marketing, 39(1), 89–103. https://doi.org/10.1016/j.intmar.2017.04.001