Experiential AR/VR: A Consumer and Service Framework and Research Agenda

Lia Zarantonello*

University of Roehampton, UK

Bernd H. Schmitt

Columbia University, USA

* Corresponding Author

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ABSTRACT

Purpose: In this paper we focus on extended reality technologies and their potential contribution to the improvement of services. First, we identify extended reality technologies (AR/VR) as the most promising interfaces to enable an experiential consumption of the services. We then summarise their properties and discuss similarities and differences. Last, we map these technologies onto a consumer psychology framework of experience to derive possible areas of future research.

Design/methodology/approach: We conduct a literature review and present a conceptual framework of AR/VR contributions on experience.

Findings: We provide an up-to-date literature review including AR and VR applications for consumer and service experience, as well as recommendations for possible research directions.

Originality: Whereas previous contributions adopted the same, experiential approach but focused on different technology (e.g., AI) or considered multiple interfaces and their impact on the consumer journey (mostly transactions), this paper aims at digging deeper into AR/VR, while retaining an experiential view on consumption that best serves the contextualisation of AR/VR.

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1. Introduction

We are in the midst of a major technology revolution that is transforming services: in the near future, many new technologies are likely to impact and transform services (such as retailing, healthcare, or hospitality), in particular, the service experience that consumers will have when they interact with service providers (Hoyer et al., 2020). In this article, we focus on the impact of a cluster of technologies described as extended reality technologies.

In October 2021, Mark Zuckerberg, CEO of the Facebook Corporation, a social-media juggernaut with a market capitalisation of more than $900Bn, announced the rebranding of its company into Meta and, in so doing, popularised the concept of "metaverse" which first saw light in the 1992 novel "Snow Crash", described as a 3D virtual world populated by avatars of real people. Zuckerberg describes his vision of a metaverse as a future "immersive internet", where the actual self and the digital self are one continuation of the other. A more articulated definition is given by the venture capitalist Matthew Ball (https://www.matthewball.vc/all/forwardtothemetaverseprimer), who describes "metaverse" as an "expansive network of persistent, real-time rendered 3D worlds and simulations that support continuity of identity, objects, history, payments, and entitlements, and can be experienced synchronously by an effectively unlimited number of users, each with an individual sense of presence".

While the vision of this persistent and pervasive augmented universe is still to come in many ways, and, according to Facebook, likely to fuel growth in the years ahead, not only for Facebook but also other businesses and society, the interfaces at the heart of its advent are already available, academically investigated and commercially pioneered: virtual and augmented reality headsets; 3D worlds like Fortnite, Roblox, and Minecraft; decentralised

Web3 services including cryptocurrency and non-fungible tokens (NFTs). Such interfaces, alongside software developments in artificial intelligence (AI) and hardware developments in robotics and the internet of things (IoT), are rapidly evolving the way people consume and experience products and services, as well as define their sense of self (Bagozzi et al., 2021). Gaming companies have been using augmented reality (AR) and virtual reality (VR) for a long time (Zyda, 2005). But many companies nowadays also use AR/VR as part of services (Wedel et al., 2020). IKEA Place, an app by the Swedish furniture company, allows consumer to scan their apartment and then imagine what it might look like with additional furniture pieces by IKEA. "View in My Room", an app by Saatchi, lets consumers experience artwork on their own walls. Many fashion brands allow consumers to take a look at themselves in fashion clothing, from department store Macy's to fast-fashion brands Asos and Zara, from mainstream sports brand Nike to luxury brand Gucci with, for example, its digital sneakers initiative. Cosmetics brands, including bareMinerals, Chanel, Maybelline, MAC, NYX Cosmetics, and L'Oreal, allow consumers to try and change lipsticks or make-up as part of a virtual setting. While the focus of this article will be consumer sectors, we note that metaverses are not only applied in B2C settings (Boyd and Koles, 2019). They are also used, for example, for repair services of various sorts of equipment or remote training of medical staff. And, as we will show, the use of these technologies mandate from us to consider how they will change the service experience and what research we can conduct as academics to shed further light on these technologies.

In line with the theme of the Special Issue, in our contribution we will focus specifically on how consumer and service experiences might change as a result of these extended reality technologies (or "metaverses"). More specifically, through a review of key academic literature to date, we aim at giving two contributions. First, we identify AR/VR—among other technologies—as the most promising interfaces to enable an experiential view of

services consumption. Second, we offer a consumer psychology framework for the concept of experience to map these AR/VR studies and derive possible areas of future research to test such framework in the digital environment. We maintain that a consumer psychology view on experience is useful in shifting the attention from explorations of technological features and their potential to the consumers' needs and desires, feelings, and barriers. This is where we believe value creation lies.

Similar initiatives focused on consumption and consumer experience have been carried out recently. They have investigated the wider sociological and psychological implications of AI adoption (Puntoni et al., 2021) and the contribution of several new technologies to moments of the consumer journey (Hoyer et al., 2020; Wedel et al., 2020). However, while the former of these initiatives presented an experiential view, it focused mainly on AI, and the latter considered multiple interfaces and their impact on the consumer journey (mostly transactions). In contrast, this paper attempts at going deeper on AR/VR, while retaining an experiential view on consumption that we maintain best serves the contextualisation of AR/VR.

More specifically, we posit that AR/VR is relevant at each phase of the consumer journey and our objective is therefore to understand *how* AR/VR can contribute to each phase by taking into account the nature and dimensionality of consumer experiences. Our work will adopt several key constructs from the consumer experience literature, to which we ourselves have contributed over the years (Andreini et al., 2018; Brakus et al., 2009; Schmitt, 1999; 2011; Schmitt and Zarantonello, 2013; Schmitt et al., 2014; 2015; Zarantonello and Schmitt, 2010; Zarantonello et al., 2021).

We begin by describing and distinguishing, as part of a literature review, AR and VR with a specific emphasis on technology features that will impact consumer and service experiences. We then present a consumer and service experience framework and apply it to

"experiential AR/VR", thus reflecting on the nature/dimensionality of these experiences, their evolution over time as consumer journey, and their relationship with other variables. We conclude by providing some directions for future research.

2. AR and VR technologies

Among the realm of emerging technologies that are impacting consumer services, AR and VR are the most promising ones from an experiential perspective. Both these interfaces enable a first-person view of the world—a view that is either integrated or simulated to meet consumer expectations and desires. If IoT, defined as an ecosystem whereby a number of digitally embedded devices (e.g., "things") communicate through the internet (Sharma et al., 2020), aims at delivering better experiences by enhancing the actual products (Saarikko et al., 2017) and service robots, described as autonomous and adaptable interfaces that interact with and deliver service to consumers (Schepers and Streukens, 2022), aim at delivering better experiences by enhancing our interactions (Pitardi et al., 2021), AR and VR have a direct impact on how people construe and experience consumption and build their sense of self through it (Wedel et al., 2020). In contrast, AI can be considered more as the software engine behind many services (Martinez, 2019); consumers experience AI through devices and interfaces, rather than AI itself (Flavián et al., 2021b). At the same time, and more than other technologies, and especially AI, AR/VR are based on sensorial stimulation and thus offer that sense of "theatricality" that has been attributed to the idea of experience (Harris et al., 2003; Pine and Gilmore, 1998), explaining how experiences may be considered as entertaining in nature.

Because of their ability to sensorially stimulate experiences that can augment the self (Javornik et al., 2021), we posit that AR and VR have a strong role to play in enhancing the way consumers experience services. Through the analysis of the literature, we also show that

the role of AR/VR can go beyond the moment of transaction and build experience by equally stimulating dimensions other than the sensory one (Hoyer et al., 2020).

Technologically, the difference between AR and VR might not always be clear cut as boundaries are not always well defined (Flavián et al., 2019). Both technologies are likely to provide relevant new information, sensory stimulation, imagination, and interaction opportunities for consumers and enable improved omnichannel experiences across different online and offline touchpoints for consumers (Hilken et al., 2018; Hoyer et al., 2020). However, AR and VR also consistently show some differences in the way they contribute to the consumer and service experience.

AR blends the virtual and real worlds (Huang and Liao, 2015); it enhances the perception of the real world with added computer-generated information (Carmignani et al., 2011) by creating "phygital" (physical and digital) experiences (Batat, 2019). AR uses devices such as smartphones or tablets to incorporate additional information (in textual, visual, or otherwise sensory form) in a natural setting, in order to improve both the visuals or use of products and provide an enhanced interactive experience for consumers (Wedel et al., 2020). From an experiential point of view, the AR experience is usually intertwined with the experience of the smart device. For example, if there is a lot of attachment to that device (Melumad and Pham, 2020), this may positively transfer to the AR features provided. Because of the technology used, which is commonly available for many consumers, AR, compared to VR, can be more easily incorporated into consumers' daily activities. Current uses of AR include advertising and communication, as well as retailing settings both online and offline (Wedel et al., 2020). In these cases, AR offers the important advantage of overcoming the impact of intangibility (Azuma, 1997) through, for instance, engaging advertising (de Ruyter et al., 2020), virtual try-on for buying clothes/make-up online (Romano et al., 2021), and virtual menus when dining out (Batat, 2021). Recent examples

include Burberry's pop-up AR experience in Harrods, Amazon's hair colouring salon, and Boohoo's AR campaign for Black Friday.

In contrast, VR has been acknowledged as a "promising avenue to for firms to create fully immersive, multi-sensory customer experiences" (De Regt et al., 2021, p. 513). It is a technology that enables the creation of an entire virtual environment where users can immerse themselves and interact with the environment in real-time (De Regt and Barnes, 2019). VR generates a perception of reality entirely based on virtual information and is artificially induced by a responsive 3-D computer-generated virtual environment. VR is characterised by immersion (i.e., the feeling of being surrounded by digital environment), presence (i.e., the feeling of existing in a virtual environment), and interactivity (i.e., the ability to virtually engage with objects and surroundings in real-time) (Lee and Chung, 2008). Moreover, the current requirement to wear a headset device can also impact the experience, and, unfortunately, not in positive ways (Wedel et al., 2020). It remains to be seen whether the headset device will be replaced by technological solutions that are more convenient and ergonometric, thus avoiding discomfort and bodily side effects. Currently, several brands are experimenting with VR as a promotional channel that enhances and builds consumer-brand relationships, including brands in the retail (Moorhouse et al., 2018) and tourism industries (Guttentag, 2010). Brand campaigns that employ VR technology offer completely synthetic and vivid worlds that can exceed the bounds of a physical reality environment. Recent examples include the Victoria & Albert's Museum exhibition of "Alice and the Curioser", where visitors could go down the hole and follow the rabbit, as well as VR entertainment activities in some Marriott hotels.

In summary, given the characteristics above described, AR has greater chance to directly affect the experience of the real world. This aspect leads to AR being involved more on routine or planned experiences. It comes as no surprise that the literature summarised in

the following focuses more on enhancing product satisfaction than brand attitudes. Try-ons for fashionwear and virtual menus for foodservice are examples of core AR applications. On the other hand, VR is characterised by an all-virtual environment. Thus, it allows immediate fruition of alternative worlds that can be configured without constraints. As such, VR offers more opportunity to design extraordinary experiences and to answer the needs of fantasising and creativity. The literature on VR also consistently focuses on brand perceptions and attitudes, and sectors like tourism or entertainment have used VR.

3. Consumer and service experiences

Experience represents an established concept in the marketing literature. Interest in the experience concept originated from the studies on experiential consumption (Holbrook and Hirschman, 1982). This work underlined the importance of emotional aspects of consumption and decision-making in addition to the well-established rational ones, in order to expand an understanding of consumer behaviour (Holbrook and Hirschman, 1982). Subsequently, research on experiential consumption has grown significantly as part of the nascent "experience economy" (Pine and Gilmore, 1998), and resulted in several new, more specific constructs being proposed in marketing, including service experience (Helkkula, 2011), online/offline shopping experience (Gilly and Wolfinbarger, 2000; Trevinal and Stenger, 2014), consumption experience (Havlena and Holbrook, 1986), and brand experience (Brakus et al., 2009), depending on the focus and perspective adopted (service marketing, retailing, consumer behaviour, or branding). In all these cases the focus is on the experience lived by consumers, as it occurs in different settings. As a whole, the consumer experience has been defined as internal, subjective consumer responses that consumers have to the various touchpoints with the company or brands (Brakus et al., 2009; Meyer and Schwager, 2007; Verhoef et al., 2009).

Service marketing scholars have examined experiences in a service consumption setting by focusing, initially, on hedonic and memorable services (e.g., river-rafting; see Arnould and Price, 1993) and considering non-hedonic, "normal, everyday" services later (e.g., Edvardsson et al., 2005), based on the understanding and agreement that service experience is ubiquitous and occur in both hedonic and non-hedonic settings. The concept of experience in the service setting has gained further attention with the service-dominant logic, which emphasises the experiential nature of value and the co-creation of service experiences (Vargo and Lusch, 2008). Based on this, the collective, interactive aspects of service experience have received further attention (Carù and Cova, 2015; Jakkola et al., 2015; McColl-Kennedy et al., 2015; Schallehn et al., 2019). Currently, service experiences are also being investigated in the light of technological advances and digitalisation of services (Dube and Helkkula, 2015; Kabadayi et al., 2019).

Over the years, three main research streams have been established in the study of consumer and service experience (Batat, 2021; Hoyer et al., 2020) One research stream focuses on the nature and dimensionality of experience. In the service context, this stream is often referred to as "phenomenological characterisation" (Dube and Helkkula, 2015; Helkkula, 2010). Another stream focuses on experiences as a process and examines its evolution over time. In this approach, concepts of "consumer/customer journey" and "journey mapping" are most prominent (McColl-Kennedy et al., 2019). The last research stream considers experience in relation to other variables, mainly outcome variables such as consumer or brand loyalty (Batat, 2021; Helkkula, 2010).

Specifically, the first established research stream in the studies on consumer and service experience discusses the nature and dimensionality of the construct. Although different interpretations have been developed over the years, there is consensus that experience is complex and multi-dimensional, consisting of several dimensions including

sensory, affective/emotional, cognitive/rational, behavioural/physical, and social/relational (Gentile et al., 2007; Schmitt et al., 2015; Verhoef et al., 2009). The focus on social and not only individual side of experience has become more relevant following advancements in the discipline including consumer culture theory and service-dominant logic; this is based on the understanding that consumers' interactions with other entities, including the firm and other consumers, are instrumental in shaping the experience lived by consumers in a marketing context (Andreini et al., 2018). The experience dimensions are connected to one another and might be evoked at the same time, thus creating holistic, more complex experiences (Schmitt, 1999). The importance of the dimensions may change in the different phases of the consumer experience. In the case of food consumption, for example, intellectual and behavioural dimensions are key before consumption, the affective and sensory dimensions during consumption, and the affective and behavioural dimensions after consumption (Zarantonello et al., 2021). Research focusing on consumption in either physical or virtual places has often adopted a different dimensionality typology for experiences, classifying those experiences as entertainment, aesthetic, escapism, and education (Pine and Gilmore, 1998). In relation to its nature, there is agreement in the literature that experiences, along the different phases of the consumer journey, may be ordinary or extraordinary (Skandalis et al., 2019), positive or negative (Barari et al., 2020), individual or shared (Wu et al., 2021), and present different degrees of co-creation between the consumer and the firm (Jakkola et al., 2015).

In relation to the second established research stream which views consumer experience as a process, Arnould, Price and Zinkan (2002) identified four macro-phases of the consumer experience, namely: (1) anticipated consumption, which includes searching, planning, daydreaming, budgeting, and fantasizing; (2) purchase experience, which refers to choice, payment, bundling product, service encounter, and atmospherics; (3) core consumption experience, which regards sensory experiences, satiation,

satisfaction/dissatisfaction, arousal/flow, and transformation; and (4) remembered consumption, which is related to reliving past experiences, often in nostalgic ways, by telling stories, comparing old and new times, talking with friends of days gone by, playing "what if", daydreaming, and sorting through memorabilia. Similarly, Lemon and Verhoef (2016) conceptualised the consumer journey as consisting of three categories: (1) the pre-purchase phase, which includes need recognition, consideration, and search; (2) the purchase phase, which covers choice, ordering, and payment; (3) finally, the post-purchase phase, which includes consumption, usage, engagement, and service requests. It is important to note that, in the context of services, the moment of consumption is not always part of the post-purchase phase, as it might occur before the purchase itself. To illustrate, in the case of a theatre show, the consumption (i.e., watching the show) follows the purchase of the show, whereas in the case of having a haircut or dining at a restaurant, the consumption comes before the purchase.

The last research stream examines consumer and service experience in relation to other variables, mainly—but not exclusively—outcomes. In addition to loyalty, which has received lots of attention (Stein and Ramaseshan, 2020), other outcome variables include consumer satisfaction, word-of-mouth, behavioural intentions, commitment, engagement, trust, and brand equity (Amoroso, 2019). Service quality and relationship quality have also been investigated in relation to experience in service research (Helkkula, 2019). Besides these outcomes, consumer and service experience have been examined in relation to antecedents, mediators, and moderators. These include environmental variables, store/online atmospherics, relationship variables, consumer characteristics and previous experiences (Amoroso, 2019).

In the next section, we discuss how these three perspectives on consumer and service experience can help understand the experiences enabled by AR/VR technologies.

4. An experiential perspective of AR/VR

In the following we look at AR/VR using an experiential perspective. This implies the application of the three research streams illustrated above, that is, nature/dimensionality of experience, experience as process, and experience in the context of other variables, to AR and VR. Figures 1 and 2 summarise this application of the experiential perspective to, respectively, AR and VR. In detail, each figure includes a representation of the main antecedents of AR/VR experiences, as well as their mediators/outcomes and moderators. These are derived from the application of the third research stream (AR/VR experience and related variables). The core of the figures is a table resulting from the application of the first and second research stream. Whereas the first research stream provides an overall typology of experience dimensions (sensory, affective/emotional, cognitive/rational, behavioural/physical, and social/relational; see Gentile et al., 2007; Schmitt et al., 2015; Verhoef et al., 2009), the second research stream gives an indication about the key phases in the consumer journey (pre-purchase/pre-consumption, purchase/consumption, post-purchase/post-consumption; see Arnould et al., 2002 and Lemon and Verhoef, 2016). If we apply these phases and dimensions of experience, we obtain a 3 (phases of experience) × 4 (dimensions of experience) framework. Please note that some cells in the framework are empty because they have not been addressed yet and are thus opportunities for future research.

Insert Figures 1 and 2 about here

4.1. AR/VR and the concept of experience

AR experiences. AR experiences are defined as immersive experiences (Scholz and Smith, 2016) or immersive brand experiences (Sung, 2021), characterised by multi-sensorial stimulation (Cuomo et al., 2020; Heller et al., 2019), high degree of interactivity (Huang and

Tseng, 2015; Yim et al., 2017), and vividness (Huang and Tseng, 2015; Yim et al., 2017). They provide consumers with a combination of hedonic and utilitarian/functional value (Hilken et al., 2018), information and learning opportunities as well satisfaction (Cuomo et al., 2020; Hilken et al., 2018). Because of the properties of AR technologies, AR experiences are described as: (i) embedded, as they integrate information about products/services in real time within the immediate decision context (Chylinski et al., 2020; Hilken et al., 2018); (ii) embodied, as they allow for physical interaction with a product/service (Chylinski et al., 2020; Hilken et al., 2018); (iii) extended (Hilken et al., 2018) or shared (Chylinski et al., 2020), as they provide consumers with opportunities of communication with peer consumers); and (iv) adaptive, as they are inherently malleable (Chylinski et al., 2020). Key conceptualisations of AR experiences are reported in Table 1.

Insert Table 1 about here

Moreover, AR experiences have been conceptualised both as unidimensional (Poushneh and Vasquez-Parraga, 2017; Tussyadiah et al., 2018) but also as complex and multi-dimensional. The dimensions examined are generally consistent with those identified in the literature on consumer and service experience illustrated above: sensory, affective/emotional, cognitive/rational, behavioural/physical, and social/relational (Gentile et al., 2007; Schmitt et al., 2015; Verhoef et al., 2009). There is divergence, however, about the number of dimensions, as AR experience has been conceptualised as consisting of two, four, or five dimensions. Two-dimension conceptualisation refers to enjoyable interaction (an affective/emotional dimension) and personal connection (a combination of affective, cognitive, and behavioural aspects) (Huang et al., 2019). One four-dimension conceptualisation leverages on Pine and Gilmore's (1999) typology of aesthetics (sensorial

dimension), entertainment, education, and escapism (mainly cognitive dimension) (Sung, 2021), whereas another four-dimension conceptualisation largely refers to affective and cognitive aspects of AR experience (with four dimensions of consumer concentration, exploratory behaviour, playfulness, and time distortion) (Huang and Tseng, 2015). The five-dimension conceptualisation is based on the evidence that AR dining experiences consist of a sensorial dimension (resulting from the stimulation of the five senses), a social dimension (resulting from the interaction with staff and other consumers), an intellectual dimension (viewed as knowledge, edutainment, enjoyment, escapism and playfulness), an affective dimension (resulting from the stimulation of mainly positive, such as excitement and enthusiasm, but also negative feelings such as boredom), and a behavioural dimension (including consumers' behavioural responses toward the restaurant's service and food) (Batat, 2021).

Each of the AR experience dimensions has also received specific attention in the literature, with scholars investigating AR experience's multi-sensory nature (Heller et al., 2019), its affective and sensorial aspects (Javornik et al., 2021), as well as the social/shared (Hilken et al., 2019; Sung, 2021) or "extended" dimension (Hilken et al., 2018). The latter dimension is instrumental to the development of AR experiences that are not only individually lived and determined, but that are also shared and co-created with peer consumers thanks to their interactive feedback (Scholz and Smith, 2016).

VR experiences. Similar to AR experiences, VR experiences are theorised in the literature as consumer-centred (De Regt et al., 2021), multi-sensory (Farah et al. 2019; Flavián et al., 2021a; Serino et al., 2018), interactive (De Regt et al., 2021; Hudson et al., 2019; Young et al., 2021), imaginary (Young et al., 2021), and immersive (Hudson et al., 2019; Ijaz et al, 2020; Rosa et al., 2021; Young et al., 2021). The latter characteristic relates to the ability of VR experiences to enable "flow" (Csikszentmihalyi, 1975), an optimal state

occurring when consumers are fully immersed in an activity or an overall sense of absorption when consumers are deeply engaged in an activity (Atzeni et al., 2021; Han et al., 2020; Wu et al., 2021). Key conceptualisations of VR experiences are reported in Table 2.

Insert Table 2 about here

The literature examining VR experiences does not explicitly discuss the dimensionality of the construct, although there seems to be agreement among scholars of the complexity of the phenomenon. Three, in particular, are the topics around which the literature is evolving which are overall aligned with the dimensions characterising the consumer and service experience. VR experiences are being explored in relation to cognitive aspects (Atzeni et al., 2021), such as their ability to enable narrative interaction and transportation and the related benefits that consumers can derive from such processes (De Regt et al., 2021; Kristofferson et al., 2016). VR experiences are also being investigated in relation to sensory/bodily aspects such as cybersickness (Rosa et al., 2021), absence/presence of a VR self (Song et al., 2021), and ownership of an artificial body (Serino et al., 2018). Finally, affective aspects of VR experiences are receiving attention (Atzeni et al., 2021); examples include virtual product appeal and emotional responses generated by VR experiences (Van Berlo et al., 2021), as well as their ability to function as "empathy-making machines", which enable consumers to experience another person's circumstances (Young et al., 2021).

4.2. AR/VR and the consumer journey

AR and pre-purchase/pre-consumption phase. AR presents several benefits in the early stages of the consumer journey. AR enables consumers to access extensive information about products and see different views of them; it also enables a better experience enriched with playful elements (Kang et al., 2020) and reduces unpleasant aspects related to physically

trying-on products (Barnes et al., 2016). AR can expand consumers' consideration set in terms of number of products that are tried (which tend to be higher), as well as styles or designs (which tend to be more eclectic and diverse). This has been observed in different settings including virtual try-on (Romano et al., 2021) and restaurants (Batat, 2021). If AR can help consumers to access a broader set of alternatives, it can also assist them to narrow their choice set given all the options in the identified consideration set (Romano et al., 2021). AR hence enables explorative and creative behaviour by helping consumers to visualise the relations of products and services in their intended context of use beyond what is feasible through mental imagery alone (Heller et al., 2019; Jessen et al., 2020). This AR-enabled consumer creativity, which is described as an intrinsically satisfying activity characterised by a sense of discovery, is encouraged by consumer engagement with AR and, in turn, improves anticipated satisfaction with the outcome of a purchase decision (Jessen et al., 2020).

In the pre-purchase/pre-consumption phase, AR advertising and brand communication more in general, which tailor the brand content in real time based on consumers' physical surroundings, plays an important role. It can increase the engagement with brand communication and allow consumers to have a better feel for promoted products (i.e., by virtually trying on a product through a banner) (De Ruyter et al., 2020). AR advertising also allows for immersive brand experiences of which aesthetics is a fundamental driver compared to entertainment, education, and escapism; in turn, these experiences can facilitate shared social experience and increase purchase intention (Sung, 2021).

There are, however, some critical aspects of AR use in the pre-purchase/pre-consumption phase. For instance, the value of brands might be mitigated by the application of AR. Consumers may live a flow experience (Barhorst et al., 2021) while exploring products and be more concentrated on the products and designs themselves rather than the brands

behind. While this may represent an opportunity for new or emerging brands, it might be a challenge for established brands (Romano et al., 2021).

AR and purchase/consumption phase. AR can facilitate the decision-making process in various ways. Through virtual try-on, AR can assist consumers with the curation of outfits by allowing them to see how products look together rather than how they fit individually (Romano et al., 2021). AR can reduce choice overload and choice confusion (Garaus et al., 2015), as well as increase choice confidence (Garaus and Wagner, 2016). AR can also deliver hedonic value in this phase as the act of purchase itself is perceived as playful and enjoyable by consumers. These pleasant aspects, however, could override the purpose of the purchase itself and its novelty factor might wear off (Romano et al., 2021). Moreover, while AR can simplify the decision-making process by giving consumers immediate and clear benefits through the ease of use of devices, the amount of information that is provided to consumers must be evaluated carefully as less information might facilitate decision-making (Cuomo et al., 2020).

Specific factors that affect behavioural intention include attitude towards the adoption of AR technology, such as the virtual try-on system (Pantano et al., 2017) or mobile app (Qin et al., 2021), which depend on its ease of use, enjoyment/gratification, perceived usefulness/informativeness which, in turn, derive from specific technology characteristics (i.e., aesthetic quality, interactivity, response time, quality of information) (Pantano et al., 2017; Qin et al., 2021). Behavioural intention also depends on user experience with AR, and factors, such as user's information privacy control, can play an important part in this process (Poushneh and Vasquez-Parraga, 2017). If AR is used in-store, the role of skilled staff is fundamental as they can support consumers take advantage of AR.

Enhanced AR can help the decision-making process even further. Emergent multisensory-AR, which blends the perception of a consumer's physical environment with

digitally enhanced interactive visual, auditory, and tactile sensory information, can alleviate the inability of consumers to imagine using or consuming a product during product evaluations and choice phases; sensory control and feedback modalities positively affect consumer value judgements and willingness to pay (Heller et al., 2019). Similarly, social AR—which is described as a static (vs. dynamic) point-of-view sharing format matched with an image-enhanced (vs. text-only) communicative act—supports shared decision making in recommender-decision maker dyads by increasing recommenders' comfort with providing advice and decision makers likelihood of using the advice in their choice (Hilken et al., 2019).

Focusing on the consumption experience, in the context of restaurants, AR can affect the dining experience by enhancing its various dimensions including the sensorial dimension (aesthetic in particular; colours and quality image), the social dimension (interaction with staff and other consumers), the intellectual dimension (as knowledge, edutainment, enjoyment escapism and playfulness) and the affective dimension (as pleasure) (Batat, 2021). Although these effects are generally positive, there can be negative aspects especially in relation to the affective dimension; entertaining aspects might prevail food perceived quality and service, in addition the AR-enhanced dining experience might be perceived boring once the novelty factor vanishes unless shared with other people who live this dining experience for the first time (Batat, 2021). Because consumers are focusing on being in the present, given the immersive nature or the experience and the flow state being stimulated, the brand value dissolves (Batat, 2021).

AR and post-purchase/post-consumption. Because of the support that AR offers before and during purchase, AR can give greater confidence in the choice and after the purchase is made. However, given the higher confidence level, if products received do not meet consumers' expectations, AR might result in greater cognitive dissonance (Romano et

al., 2021) and sadness as the real world in this phase is not as exciting as AR in previous one (Batat, 2021).

VR and pre-purchase/pre-consumption phase. VR can support the awareness and consideration stages at the beginning of the consumer journey (De Regt et al., 2021; Farah et al., 2019). Compared to physical stores, VR is expected to become increasingly important in these early stages in the future (Farah et al., 2019). Specifically, the sensory stimulation provided by VR is linked with various advantages for brands. In a service context (i.e., tourist destinations), sensation-seeking consumers are more inclined to use VR for evaluating alternatives (Vishwakarma et al., 2020). Also, multi-sensory experiences that go beyond the stimulation of sight and hearing and that are enriched with congruent olfactory stimulation are associated with better image (Flaviàn et al., 2021).

Moreover, dialogic engagement, brand prominence, and consumer perceived control of VR videos can affect brand perception and recall (Wang and Chen, 2019). In the context of branded VR games, that is, VR games that incorporate the brand (i.e., "The Neymar Jr. Effect" game), virtual product appeal strengthens the effect of brands on brand attitude and brands in VR games elicit emotional responses which subsequently drive brand attitude (van Berlo et al., 2021). While there are no significant differences for the brand in terms of the type of VR technology used, in terms of what not to include in VR, the absence of virtual self-representation in VR advertising, especially if not tailored for each consumer, is associated with positive effects on consumers' liking the ad and favourable attitude toward the advertised brand (Song et al., 2021). This effect can be explained with self-presence, that is the feeling of oneself being immersed in a virtual environment, which does not require a body representation in the form of an avatar (Song et al., 2021).

VR and purchase/consumption phase. Purchase intention and related variables have been examined in various contexts including branded VR games (e.g., "The Neymar Jr.

Effect" game) and VR-style websites for service brands (i.e., tourist destinations). In relation to the former, virtual product appeal strengthens the effect of brands on brand attitude and brands elicit emotional responses which subsequently drive brand attitude and purchase intention (van Berlo et al., 2021). With regards to VR-style websites for service brands, VR experiences do not always lead to favourable future intentions (Deng et al., 2019). VR experiences that are perceived as similar to the actual ones may satiate consumers and reduce their desire to engage in future consumption. However, this depends on consumers' perceived differences between virtual and actual experiences, consumer's enduring involvement, and possibility to replicate the experience online in full (Deng et al., 2019).

VR and post-purchase/post-consumption. VR is considered an important tool at the end of the consumer journey, namely at the loyalty and advocacy stage (Farah et al., 2019). VR usage is likely to maintain the relationship with consumers after the purchase (Farah et al., 2019) and can support brand advocacy through brand attachment and affective brand engagement, narrative transportation, and social interaction (De Regt et al., 2021).

Focusing on the consumption experience for luxury brands, one study (Jung et al., 2021) sheds light on the meanings that consumers derive from VR usage in the post-consumption phase. These meanings tend to be ambivalent and include: (1) VR as democratisation, as VR experiences can democratise and commodify even the most exclusive physical consumption experiences; (2) VR as embodied escapism, as they are intrinsically enjoyable and facilitate escape from their daily routines; finally (3) VR as actualised anxiety, given that VR experiences are associated with anxiety, loneliness and even fear by consumers.

4.3. AR/VR experiences and their nomological network

Nomological network of AR experience. AR experiences have been examined in relation to several other variables and have been the core of conceptual models including

antecedents, mediators, moderators, and/or outcomes. In relation to antecedents, what emerges from the literature is the presence of three main categories. The first is AR technology-related, the second is centred on the connection between AR technologies and consumers, and the third is focused on consumers variables. The AR technology-related category comprehends variables such as vividness (Barhorst et al., 2021; Huang et al., 2015; Yim et al., 2017), realism/authenticity of AR (Sung 2021), novelty (Barhorst et al., 2021; Yim et al. 2017), visual appeal (De Ruyter et al., 2020), information fit to task (De Ruyter et al., 2020), and re-processability (Huang et al., 2019). The technology-consumer connection category includes interactivity (Barhorst et al., 2021; Poushneh and Vasquez-Parraga, 2017; Yim et al., 2017), technology sensory modality (Huang et al., 2019), technology embodiment (Tussyadiah et al., 2018), and sense of ownership control (Huang et al., 2015; 2019). The last category of antecedents, which is focused on consumers, includes variables as enjoyment (Tussyadiah et al., 2018), online browsing involvement (Huang et al., 2019), and need for touch (Huang et al., 2015).

The set of mediators and outcomes that can be found in the literature is broad because of different perspectives adopted (e.g., focus on responses to AR advertising or consumer behavioural intentions). Specifically, some mediating and outcome variables are related to the medium through which AR experiences are provided. These include attitudes toward the medium (Alimamy and Al-Imamy, 2021; Yim et al., 2017), media usefulness (Yim et al. 2017), AR ad satisfaction (Sung 2021), and advertising outcome metrics (De Ruyter et al., 2020). Other mediators/outcomes include: affective variables, such as user satisfaction (Poushneh and Vasquez-Parraga, 2017), satisfaction with AR experience (Barhorst et al., 2021) and enjoyment (Barhorst et al., 2021; Yim et al., 2017); cognitive variables, such as learning (Barhorst et al., 2021), information utility (Barhorst et al., 2021), and perceived value (Alimamy and Al-Imamy, 2021); and behavioural variables, such as purchase intention

(Sung, 2021; Yim et al., 2017) and willingness to buy (Poushneh and Vasquez-Parraga, 2017). Other types of AR experiences, new or social brand experiences (Sung, 2021), are also part of mediators and outcomes that have been studied in relation to AR experience.

Moderators have been included mainly in the study the relationship between antecedents and AR experience. These comprise trade-off between price and value (Poushneh and Vasquez-Parraga, 2017), body surveillance (Huang et al., 2019), and fashion consciousness (Huang et al., 2019). Privacy-related variables, such as user's information privacy control (Poushneh and Vasquez-Parraga, 2017) and privacy protection (De Ruyter et al., 2020), have been conceptualised and/or tested as moderators in both the relationship between antecedents and AR experiences and AR experiences and outcomes.

Nomological network of VR experience. VR experiences have been examined in relation to two main antecedents. One refers to the type of technology used (Flavián et al., 2021a; Song et al., 2021; Van Berlo et al., 2021), whereas the other relates to the characteristics of VR experience, such as its authenticity (Atzeni et al., 2021).

The set of mediators and outcomes is broader, and this reflects the different focus of scholars in their respective studies. These can be grouped in five main categories. The first of these categories focuses on the responses to the VR experience itself and includes variables such as VR experience satisfaction (Atzeni et al., 2021; Hudson et al., 2019) and perceived similarity between actual and VR experiences (Deng et al., 2019). The second category focuses on the responses to the ad, such as liking the ad (Song et al., 2021), whereas the third category includes responses towards the brand such as attitude toward the advertised brand (Song et al., 2021; Van Berlo et al., 2021), affective brand engagement and brand advocacy (De Regt et al., 2021), and conative/affective image of a destination brand (Flavián et al., 2021a). The fourth category contains behavioural variables such as purchase intention (Van Berlo et al., 2021), intention to purchase (Song et al., 2021) or visit (for a destination brand;

Atzeni et al., 2021), loyalty intentions (Hudson et al., 2019), and consumption intentions (Deng et al., 2019). The last category comprehends other consumer-related variables such as enduring involvement (Deng et al., 2019), virtual representation of the self, (Song et al., 2021), attachment to VR technologies (Atzeni et al., 2021), and ease of imagination (Flavián et al., 2021a).

The set of moderators considered so far in related to VR experience is rather limited. This includes environmental variables, such as ambient scent (Flavián et al., 2021a), and product variables, such as virtual product appeal (Van Berlo et al., 2021).

5. Research directions

The review of the literature conducted so far, where the main academic contributions on AR and VR have been explored through the lens of the consumer and service experience, brings us to identify three broad directions of future research. We propose that future research should focus on: (1) advancing the conceptualisation of AR/VR experiences; (2) including more consumer-related antecedents and outcomes in the study of AR/VR experiences; and (3) expanding the AR/VR experience journeys. These research directions are articulated in the following.

5.1. Advancing the conceptualisation of AR/VR experiences

The review above showed the multitude of conceptualisations of experience that exist in relation to AR (see Table 1). Although there is general agreement on the complex nature of AR experiences and their multi-dimensional nature, it is still rather unclear how and to what extent these conceptualisations differ from one another. Future research could examine the commonalities and differences between the various conceptualisations of AR experiences both theoretically and empirically. Tracing their boundaries and testing their discriminant validity, also in relation to established consumer and service experience-related concepts such

as experiential value (Mathwick et al., 2001) or service experience quality (Chang and Horng, 2011), could help achieve a common understanding of AR experience and support research examining relationships with other variables.

In contrast, fewer contributions have been developed in relation to the nature and dimensionality of VR experience so far, possibly because of the more limited application of VR technologies across different industries. In the light of the current scarcity of conceptualisations (see Table 2) and studies of dimensionality, future research could focus on further theorising VR experiences and investigating their dimensionality more explicitly. By so doing, it could further clarify commonalities and difference between AR and VR experiences.

Future research could also examine how to enhance AR and VR experience. Both AR and VR experiences would benefit from more research on sensorial stimulation that goes beyond sight, following up on what some scholars have already done in relation to AR (Cuomo et al., 2020; Heller et al., 2019). Similarly, the capability of AR/VR experiences to influence the cognitive and social dimensions of experience is beginning to be studied, for example in relation to narrative transportation in VR (De Regt et al., 2021) and social AR experiences (Sung et al., 2021). How could the cognitive and social dimensions be stimulated in each phase of the consumer journey?

Moreover, both AR/VR experiences could be investigated in terms of the negative valence that characterise them. From the 3 × 4 table in Figure 1 (AR) and Figure 2 (VR), it is evident that some negative aspects have been already identified in the literature, such as cybersickness (Rosa et al., 2021) and anxiety (Jung et al., 2021) in relation to VR and sadness (Batat, 2021) in relation to AR. What is the impact of these negative aspects on the quality of the VR or AR experience? And how could these negative aspects be counterbalanced in the consumption of VR and AR services?

We also propose that researchers also consider metaverses from an evolutionary perspective. Humans, and their brains and bodies, have developed as part of biological evolution in response to natural environments. As metaverses expands beyond the natural worlds, they are some degrees incompatible with the bodily apparatus that evolution has built. As a result, people at times experience sensory confusion and must learn new sensory and bodily skills when they use VR and, to a degree, AR devices. Thus, it seems to us, researchers should consider evolutionary ideas in parallel to psychological and social processes when they study how new consumer and service experiences, enabled by metaverses, unfold in a face-to-face or impersonal service context.

5.2. Including more consumer-related antecedents and outcomes

The second direction of research that we identify based on our literature review and conceptual integration relates to the type of antecedents and outcomes studied in relation to AR/VR experiences. As evident from Figure 1 (AR) and Figure 2 (VR), the majority of variables that have been studied in relation to AR/VR experiences is related to the efficiency and functionality of these experiences, such as vividness and interactivity for AR (e.g., Yim et al., 2017) as well as authenticity for VR (e.g., Atzeni et al., 2021). Expanding the set of consumer-related variables studied in relation to AR/VR experiences could help better understand the impact of these experiences not only on an individual level but also on society at large and have an enduring, sustainable role beyond the narrow focus on operational efficacy of the technology in the transaction.

In relation to antecedents and moderators, future research could focus more on consumer-related variables in terms of adoption such as personal traits of early adopters and psychological barriers of specific social groups with the aim of understanding how to overcome these barriers and make AR/VR experiences available to wider groups of consumers. For example, popular knowledge has discussed a “generational divide”. What is

the evidence and, if it is a widespread phenomenon, how can it be addressed? Consumer personality, value orientations and involvement in different product categories are other examples of consumer-related variables that might have a moderating effect in the study of AR/VR experiences.

In terms of outcomes, whereas research on VR experiences has considered a variety of responses, research on AR experiences has examined a narrower set of possible outcome variables. It would be useful, in particular, to include variables beyond the typical evaluation and behavioural intention and consider other variables that are relational in nature. These include, for example, various types of responses towards the service brand in the context of the relationship between consumers and service brands. Both AR/VR experiences could benefit from the study of other longer-term outcomes such as consumer identity (Black and Veloutsou, 2017), happiness, and subjective well-being (Mogilner and Norton, 2015). Future research could investigate the whole range of emotions derived from the AR/VR enhanced consumer and service experience. What types of emotions are involved in the experience? What copying mechanisms emerge with negative emotions? What AR/VR properties and traits drive long-term happiness from consumption experiences? Similarly, research is needed on how VR/AR experiences can contribute to well-being. What are the positive and negative effects of these interfaces? Are VR and AR at risk of addictive behaviours because of their engaging properties? What implication on mental and physical health, and on the "sense of reality"? Finally, more research initiative should investigate the relationship between AR, VR and the sense of self or identity. AR and VR allow consumers to experience mediated interactions, with modified selves or others. Is VR immersive experience at risk of alienating and driving isolation of connections? Will AR hybrid experience blur the lines of human identity into cyborg identity? Would this be accepted by consumers?

5.3. Expanding the AR/VR experience journeys

Most AR/VR experience research to date is concentrated on the pre-consumption phase and measures outcomes such as brand awareness and engagement. Future research should expand the scope to studying the design of effective AR/VR experiences across pre-, during, and post-purchase/consumption.

At the pre-purchase/consumption phase, more investigation would be beneficial on the actual ability of VR to stimulate thinking and planning, beyond fantasizing aspects driven by its "theatricality" and engagement. Additional research should investigate AR advertising effectiveness, including its propensity to drive purchase intent beyond low-tech alternatives. For example, when is the AR pre-purchase experience so gratifying that it surrogates actual purchase? Also, what is the likely outcome of the increased possibility to explore products that AR/VR offer in the pre-purchase phase? Does AR/VR stimulate more impulse or more a planned purchase? Does AR/VR trigger more information overload or simplify decision making?

During the consumption phase, it has been noticed that VR lacks a direct sales conversion (Li et al., 2002). For example, lots of research in tourism/hospitality has studied how to increase purchase intention based on characteristics of VR videos (e.g., Wang and Chen, 2019). Could VR videos become an offer per se (Pine and Gilmore, 1998), which consumers may buy irrespectively of the actual trip to the location? What characteristics of the digital offer could be used to increase perception of dissimilarity with the actual location? In a different vein, AR/VR allows for social and shared consumption in real time. Is this dimension a driver of purchase intent? In addition, how could AR and VR be used to remove "pain points" in the consumer experience related to the act of payment? What is the right balance between privacy and personalisation that consumers are willing to accept to make the experiences frictionless?

Finally, regarding post-purchase consumption phase, research on AR/VR application is still limited. How could these technologies be used to help consumers remember their experience and share them with others? The perfect AR and VR enhanced experiences could be recorded, shared, and re-played. Is such a continued and looped experience appealing for consumers?

Last, beyond these specific moments, research should study conceptually and empirically how AR and VR can be integrated to support one common consumer and service experience. What combinations are most effective given AR/VR similarities and differences? Also, could we validate the assumption that VR could be used to engage, AR to choose, AR/VR to remember and share the experience with others? What elements of reality should be retained, augmented, or completely virtualised to create optimal experiences of services?

6. Conclusion

In this paper we have presented a framework that conceptualises and studies how AR/VR technologies shape and impact the consumer and service experience. The framework posits that researchers need to examine experiential AR/VR at different phases of the consumer journey and consider the nature and dimensions of experience as part of their analysis; they also need to consider other variables that might impact, or on which AR/VR experiences might have an impact on, in the overall consumer and service experience. The view that we presented is also useful for service managers as they examine how to use AR/VR and potentially other extended reality technologies in the future as part of their businesses. By considering in detail how their consumers view these new technologies and the new worlds created by them, managers in many service industries may deliver great value to their consumers.

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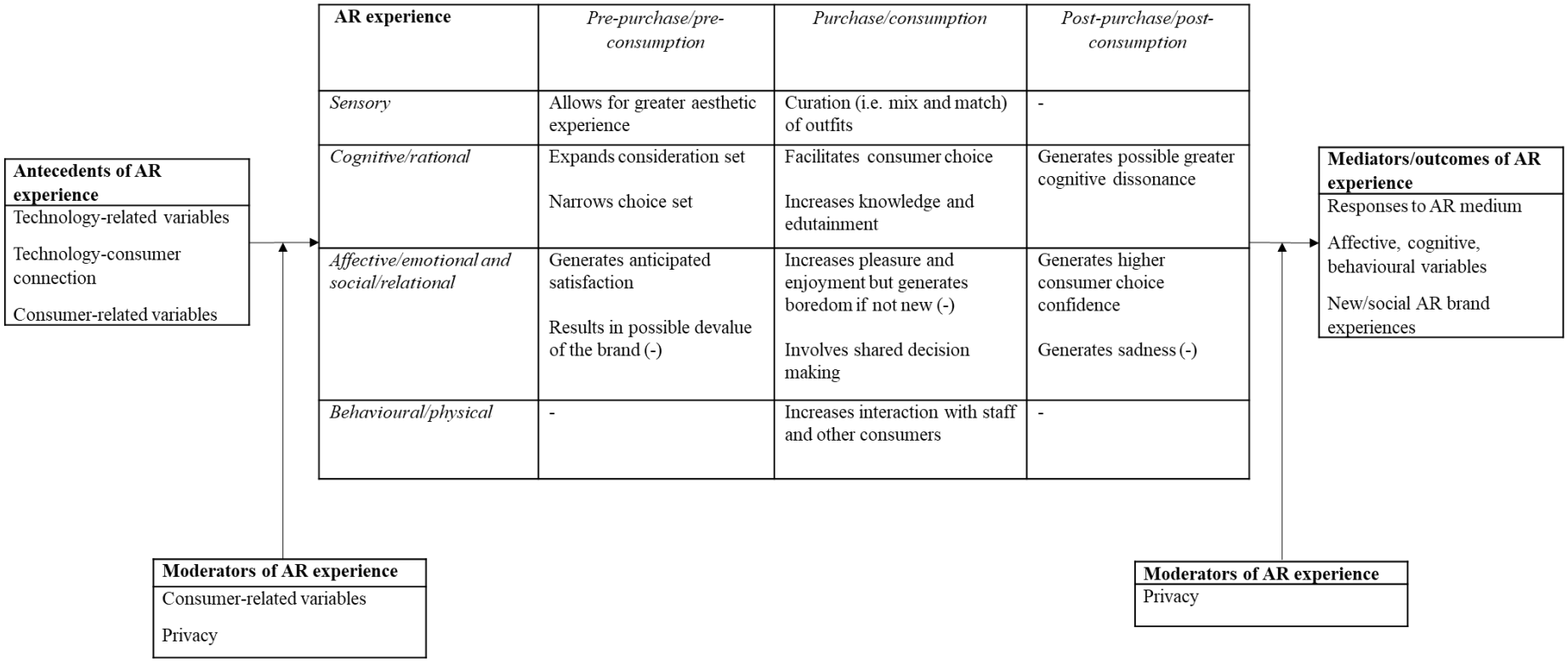
Table 1 – Key conceptualisations of AR experiences

Concept	Source
AR experiences (alphabetical order)	
Adaptive experience	Hilken et al., 2018; Chylinski et al., 2020
Aesthetic/entertaining/educational/escapist experience	Sung, 2021
AR explorative experience	Huang and Tseng, 2015
AR-enabled omnichannel experience	Hilken et al., 2018
ARM (augmented reality marketing) experiences	Chylinski et al., 2020
Enhanced brand experience	Javornik et al., 2021
Embedded experience	Hilken et al., 2018; Chylinski et al., 2020
Embodied experience	Hilken et al., 2018; Chylinski et al., 2020
Extended experience	Hilken et al., 2018; Chylinski et al., 2020
Experience	Tussyadiah et al., 2018
Immersive experience/immersive brand experience	Scholz and Smith, 2014; Sung, 2021
New brand experience	Sung, 2021
Omni-customer brand experience	Cuomo et al., 2018
Rapport experience	Huang et al., 2019
Shared social experience / share experience	Sung, 2021
Situated customer experiences	Chylinski et al., 2020
User experience	Poushneh and Vasquez-Parraga, 2017

Table 2 – Key conceptualisations of VR experiences

Concept	Source
VR experiences (alphabetical order)	
Computer-mediated consumer experiences	Van Berlo et al., 2019
Immersive VR experience	Rosa et al., 2021; Young et al., 2021
Multisensory bodily experience	Serino et al., 2018
Quality immersive empathy building experiences	Young et al., 2021
VR ad experiences	Song et al., 2021

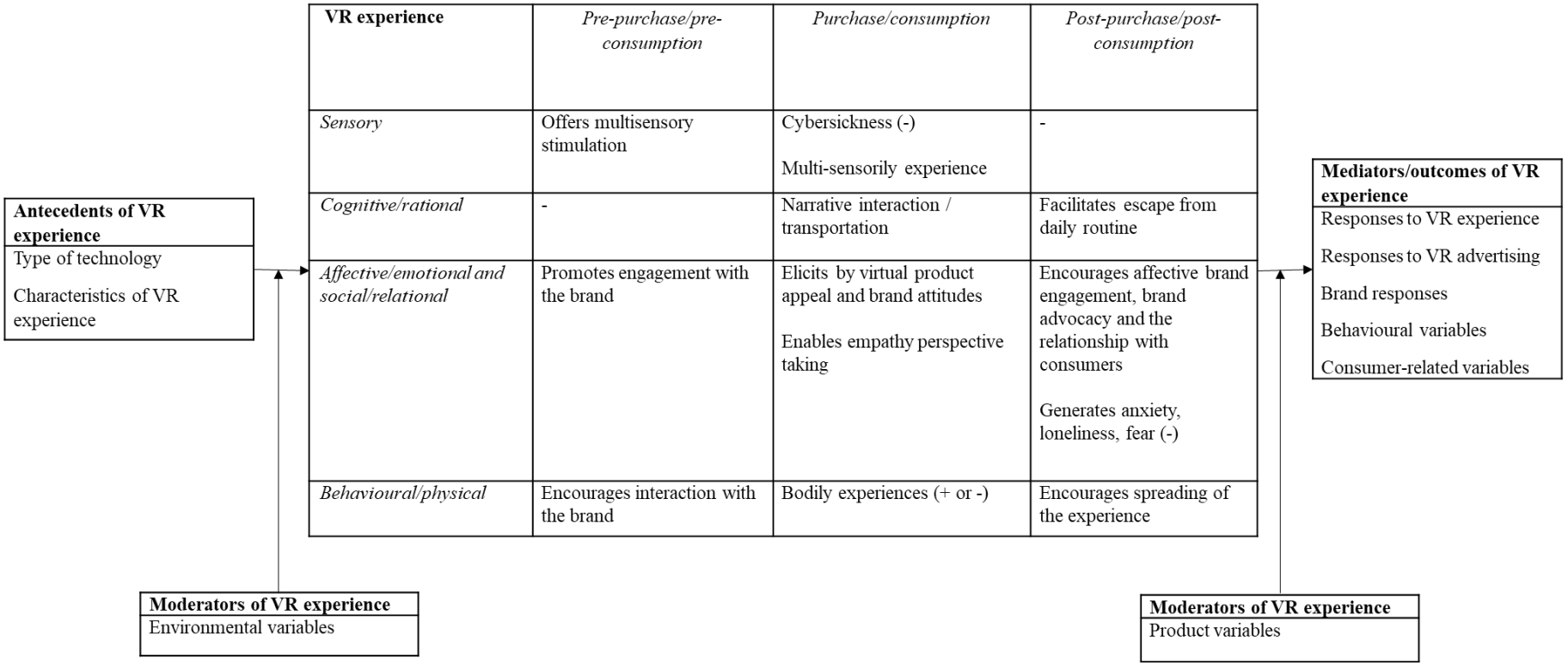
Figure 1 – Experiential AR



AR experience	*Pre-purchase/pre-consumption*	*Purchase/consumption*	*Post-purchase/post-consumption*
Sensory	Allows for greater aesthetic experience	Curation (i.e. mix and match) of outfits	-
Cognitive/rational	Expands consideration set Narrows choice set	Facilitates consumer choice Increases knowledge and edutainment	Generates possible greater cognitive dissonance
Affective/emotional and social/relational	Generates anticipated satisfaction Results in possible devalue of the brand (-)	Increases pleasure and enjoyment but generates boredom if not new (-) Involves shared decision making	Generates higher consumer choice confidence Generates sadness (-)
Behavioural/physical	-	Increases interaction with staff and other consumers	-

Note: negative valence is indicated as (-)

Figure 2 – Experiential VR



VR experience	*Pre-purchase/pre-consumption*	*Purchase/consumption*	*Post-purchase/post-consumption*
Sensory	Offers multisensory stimulation	Cybersickness (-) Multi-sensorily experience	-
Cognitive/rational	-	Narrative interaction / transportation	Facilitates escape from daily routine
Affective/emotional and social/relational	Promotes engagement with the brand	Elicits by virtual product appeal and brand attitudes Enables empathy perspective taking	Encourages affective brand engagement, brand advocacy and the relationship with consumers Generates anxiety, loneliness, fear (-)
Behavioural/physical	Encourages interaction with the brand	Bodily experiences (+ or -)	Encourages spreading of the experience

Note: negative valence is indicated as (-); positive or negative valence is indicated as (+ or -)