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The value of augmented reality: exploring hedonic and utilitarian augmented reality experiences

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The value of augmented reality: exploring hedonic and utilitarian augmented reality experiences

Abstract

Purpose – The current study explores two distinct augmented reality (AR) experiences (hedonic and utilitarian) to determine the drivers of satisfaction and word-of-mouth (WOM). Specifically, this research investigates how different AR characteristics (person-virtual environment (VE) interaction, novelty) impact reality congruence and immersion, which ultimately lead to satisfaction and WOM.

Design/methodology/approach – We tested the proposed model using a United States consumer sample (N = 401) by applying partial least squares structural equation modeling (PLS-SEM) to reveal differences across the AR experiences regarding the mediating effects of immersion and reality congruence. Furthermore, we administered PLS-SEM multigroup analysis to identify differences for hedonic and utilitarian AR experiences.

Findings – This study provides important insights into the use of AR to create value-driven consumer experiences and outcome behaviors. Interacting with the virtual environment enhances immersion for hedonic AR experiences while it leads to higher levels of reality congruence for utilitarian AR experiences. While established relationships such as novelty to immersion continue to be significant, new constructs such as person-VE interaction and reality congruence immerse as stronger influences.

Originality/value - To date, most studies have implemented apps such as IKEA Place and have considered value as one comprehensive construct. However, limited research has examined differences in hedonic and utilitarian AR experiences. The current findings enhance the understanding of utilizing value-driven consumer experiences within the AR context to achieve desirable outcome behaviors.

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4 **Research paper**
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7 **Keywords** Hedonic experiences, Utilitarian experiences, Augmented reality, AR, Reality
8 congruence, Word-of-mouth (WOM), PLS
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Internet Research

1. Introduction

The upward trend of digital transformation has strong implications on marketing strategies, in terms of importance of value propositions, value creation, and customer experiences (Hoyer *et al.*, 2020; Krey *et al.*, 2023). In contrast to virtual reality (VR), augmented reality (AR) apps place immersive digital information onto users' direct field of vision (Barhorst *et al.*, 2021; Chen *et al.*, 2024). As such, the real environment remains fully visible, and users are not isolated from the real world (Rauschnabel, 2021). In this way, AR is a powerful marketing tool because it provides a digitally enhanced reality, rather than disconnecting users from reality (Chen *et al.*, 2024; Jayaswal and Parida, 2023; Sung, 2021). Rauschnabel *et al.* (2022) defined AR marketing as a strategic integration of AR experiences that can be combined with other media. The goal of AR marketing is to create value for brands, stakeholders, and society. For that reason, AR is increasingly being used as part of a balanced marketing strategy and has been praised as a tool to improve strategic brand loyalty and drive digital transformation (Rauschnabel *et al.*, 2022).

Various AR experiences have been introduced by companies with varying levels of complexity and features. The first AR applications were used to create a "wow" factor delivering static videos and basic content, often leaving the bad taste of a marketing gimmick; however, today's companies start to recognize the power of immersive storytelling through interactive well-designed content. Examples of AR experiences include ModiFace, a virtual makeover tool used by make-up and cosmetic brands. This type of technology has also been used in virtual mirrors, now found in many beauty stores, to enhance in-store experiences through AR. Overall, these AR experiences assist consumers in completing purchase decisions (Huang and Liao, 2017). In contrast, other apps have been designed to create enjoyable and engaging brand experiences such as face filters (Javornik *et al.*, 2022). These different types of AR applications

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2
3 generate different user and behavioral outcomes; however, this does not always relate to the
4 intended marketing strategy. Often, AR is employed as a fun tool rather than a well-thought
5 addition to the overall marketing strategy falling short of creating value-added consumer
6 experiences (e.g., utilitarian, hedonic).
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12 The current study is rooted in the utilitarian-hedonic approach (Akdim *et al.*, 2022;
13 Flavián *et al.*, 2022; Liu *et al.*, 2020). Introduced by Babin *et al.* (1994) in the early 90's,
14 hedonic and utilitarian motivations are part of shopping experiences. The utilitarian-hedonic
15 approach is needed to better understand consumer behavior and value creation in AR
16 environments (Liu *et al.*, 2020), as consumers' utilitarian and hedonic motivations strongly affect
17 what kind of experiences and environment they seek (Demoulin and Willems, 2019).
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26 While both dimensions of value have received ample attention within the last 20 years
27 (Babin and Krey, 2020; Picot-Coupey *et al.*, 2021), research within the AR marketing context is
28 limited and should explore these conditions independently (Rauschnabel *et al.*, 2019). Akdim *et*
29 *al.* (2022), looking at the social media context, agreed that usage behavior needs to be considered
30 multi-dimensional and therefore research should explore utilitarian and hedonic motivations. For
31 example, IKEA's Place AR application (app)¹ allows customers to position augmented furniture
32 into their homes, thus creating utilitarian benefits. In contrast, Lego² creates hedonic experiences
33 using AR to bring products to life through interactive features and gaming. The enhancement of
34 customer experiences via these types of AR applications is receiving increased attention (e.g.,
35 Alimamy and Nadeen, 2021; Riar *et al.*, 2023). Further research is necessary to identify potential
36 differences or similarities of drivers and outcomes of hedonic and utilitarian experiences in this
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55 ¹ <https://www.ikea.com/gb/en/customer-service/mobile-apps/>

56 ² <https://www.lego.com/en-gb/themes/technic/ar-app>

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3 new environment compared to traditional environments, such as in-store, online, or apps (Picot-
4
5 Coupey *et al.*, 2021).
6

7
8 Rooted in the utilitarian-hedonic approach, our study makes three contributions to the
9
10 field of AR marketing:
11

- 12 1. To test hedonic and utilitarian AR experiences to explore the differences and
13
14 commonalities with regards to consumer behavior.
15
- 16 2. To determine the AR drivers of satisfaction and word-of-mouth (WOM).
17
18
- 19 3. To examine novel, low-cost AR apps to enhance generalizability and understanding of
20
21 AR experiences (Alimamy and Al-Imamy, 2022; Sung, 2021).
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23

24 Specifically, this research investigates how different AR characteristics (person-virtual
25
26 environment (VE) interaction, novelty) impact reality congruence and immersion, which
27
28 ultimately lead to satisfaction and WOM. Furthermore,
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30
31 Following the introduction and theoretical justification of the paper, we will present
32
33 literature exploring the use and experiences of AR in marketing and beyond. Next, the research
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35 model and hypotheses are presented before discussing the methodology. Thereafter, the analysis
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37 and results including a comparison of the AR utilitarian value (AR-UV) experience and AR
38
39 hedonic value (AR-HV) experience are presented. Finally, the conclusion, implications, and
40
41 limitations are discussed.
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44 **2. Literature review**

45
46 Babin *et al.* (1994) explored that shopping activities and overall consumption of products
47
48 and services result in utilitarian and hedonic consequences. Their research introduced the
49
50 perceived shopping value scale, differentiating between hedonic and utilitarian value as major
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52 outcomes of consumption experiences (Picot-Coupey *et al.*, 2021). Following this research, there
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3 have been ample marketing studies exploring utilitarian and hedonic motivations from a value
4 perspective (Vieira *et al.*, 2018). Utilitarian value refers to the extrinsic motivation of performing
5 an action, such as gaining benefits in terms of convenience in information retrieval and seeking
6 (Chiu *et al.*, 2014). In contrast, hedonic value is defined as an intrinsic motivation, leading to
7 experiences perceived as enjoyment-oriented, fun, and exciting (Sharma *et al.*, 2020). Hedonic
8 value brings information to life and increases motivation to engage with as well as retrieve
9 information (Mittal *et al.*, 2020). Hedonic AR experiences are common in entertainment, cultural
10 heritage, and educational contexts. Here, AR is used to enhance experiences through an engaging
11 and interactive approach (tom Dieck and Han, 2021).

22
23
24 Existing research in the AR marketing field has applied theories such as the technology
25 acceptance model (TAM), stimulus-organism-response (SOR) theory, or uses and gratification
26 theory (i.e., Hamari *et al.*, 2019; Hwang *et al.*, 2023; Jiang and Lyu, 2024). However, often these
27 theories explored well-established dimensions of marketing, user acceptance and behaviors.
28 According to Javeed *et al.* (2024), there is a need for new theoretical lenses to understand and
29 explore AR-specific emerging themes. A recent stream of research identified the importance of
30 focusing on the utilitarian-hedonic approach. Hereby, research aims to explore the differences
31 between utilitarian and hedonic experiences with the aim to inform successful application design,
32 implementation, and uptake (i.e., Akdim *et al.*, 2022). Identifying context-specific antecedents
33 and behavioral outcomes such as WOM were among the key recommendations for future
34 research (Akdim *et al.*, 2022).

3. Proposed model

3.1. *Person-VE interaction and novelty*

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2
3 **Person-VE** interaction is a relatively new concept that has received limited attention
4
5 within previous research. Considering AR's characteristics of digitally blending content into
6
7 users' direct field of vision, it is an immensely important construct for AR marketing research. It
8
9 is grounded in servicescape and experiencescape literatures which reflects the ability of
10
11 customers to interact and engage with the consumption environment (Hudson *et al.*, 2019).
12
13 Regarding digital technologies such as AR, virtual experiencescapes encompass the physical, as
14
15 well as the virtual, experience mediated by a digital interface (Hudson *et al.*, 2019). As such, we
16
17 posit that the interaction of the consumer with the virtual environment is a critical component of
18
19 AR.
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24 To date, person-VE interaction has been studied as an influencing factor on consumers'
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26 perceived immersion (e.g., Hudson *et al.*, 2019). Heller *et al.* (2021) referred to the person-VE
27
28 interaction concept as spatial presence (the perceived tangibility of the experience) and supported
29
30 it leading to cognitive and emotional engagement. Similarly, according to Hudson *et al.* (2019),
31
32 consumers' interaction with virtual objects enhanced immersion, in which an increase in
33
34 interactive features is directly linked to the perceived degree of immersion. For example, AR
35
36 experiential marketing apps such as IKEA allow users to place over 2000 furniture models in
37
38 their own homes, which not only saves customers time, but enhances brand awareness and
39
40 perceived value of products (Chen *et al.*, 2022). In this study, we argue that person-VE
41
42 interaction creates an enhanced sense of reality congruence - the degree of augmented quality
43
44 (see below) (c.f. Kumar, 2022). In the e-marketplace context, Yoo *et al.* (2015) supported the
45
46 link between the degree of interactivity to perceived information quality. When consumers
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48 perceive an AR experience to be interactive with the freedom to move around the virtual
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environment, it is believed to strongly influence both the sense of feeling immersed in the experience, as well as a perception of quality of the virtually enhanced real environment.

H1a: *Person-VE interaction positively influences reality congruence.*

H1b: *Person-VE interaction positively influences immersion.*

AR has long been considered an innovative technology; however, it is becoming more widely used within the business and marketing landscape (tom Dieck *et al.*, 2024). Nonetheless, AR applications and use cases are still developing, hence AR continues to be considered a new marketing approach due to limited research and a sparse number of recent use cases (Saleem *et al.*, 2022). Novelty is associated with something new, distinctive, fresh, and unfamiliar (Barhorst *et al.*, 2021). Within their qualitative research on AR smart glasses, tom Dieck *et al.* (2016) found them to be innovative, fresh, and exciting.

Jessen *et al.* (2020) reiterated that novelty within the AR context does not necessarily refer to AR being a “new” application and technology, but users’ being provided with unusual and new ways to engage. Uhm *et al.* (2022,) agreed that an AR is a useful tool when introducing innovative products with unfamiliar features or characteristics. More recently, AR novelty has been linked to increased levels of immersion (Yim *et al.*, 2017). In addition, Oyman *et al.* (2022) supported that novelty seeking influences perceived AR referring to the concept of reality congruence. Based on the aforementioned discussion we propose:

H2a: *Novelty positively influences reality congruence.*

H2b: *Novelty positively influences immersion.*

3.2. Reality congruence

Kumar *et al.* (2024) developed a taxonomy of AR marketing whereby they identified reality congruence as one of the key AR marketing attributes. Reality congruence encompasses the fit between virtual and real products. It reflects the presentation of the virtual content, its

1
2
3 vividness, visual appeal, and attractive provision of information (Kowalczyk *et al.*, 2021).

4
5 Within AR marketing, businesses aim to achieve a realistic representation of actual products and
6
7 services to evoke feelings similar to those experienced shopping in-person (Jayaswal and Parida,
8
9 2023; Rauschnabel *et al.*, 2019). Overall, AR aims to create a sense of “realness” and therefore
10
11 reality congruence should be one of the critical factors in any marketing study. Within the AR
12
13 retailing context, Xu *et al.* (2024) argued that reality congruence influences consumers’ cognitive
14
15 assimilation and positive affection. The employment of varied terminology to express a singular
16
17 concept exacerbates confusion and underscores the necessity for additional investigation into the
18
19 concept of reality congruence.
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24 For instance, Kumar (2022) referred to it as augmented quality and supports its influence
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26 on perceived value within the AR retailing context. Furthermore, Poushneh (2018) and
27
28 Rauschnabel *et al.* (2019) introduced the concept as augmentation quality. The attractiveness of
29
30 design and information has also been referred to as esthetics within the concept of experience
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32 economy (e.g., Lee *et al.*, 2020). According to Ramdani *et al.* (2022), reality congruence of AR
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34 applications significantly increased users’ perception of functional benefits (e.g., efficiency,
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36 convenience). Considering the importance of using a utilitarian-hedonic approach to fully
37
38 understand consumer behavior as discussed by Demoulin and Willems (2019), research
39
40 incorporating reality congruence has been limited. Sun *et al.* (2022) claimed realistic product
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42 displays in AR reduce the risks of product quality uncertainty by providing perceived
43
44 informativeness, which clearly links it to the importance for utilitarian experiences. Song *et al.*
45
46 (2019) discussed the concept of environmental embedding within AR (e.g., I was able to see how
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48 the watch looked on my wrist/I felt I wore this watch on my wrist) and confirmed a strong
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3 influence on immersion. Hence, the more realistic an AR experience is perceived to be, the
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5 stronger the sense of immersion experience by its users, thus, we propose:

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8 **H3:** *Reality congruence positively influences immersion.*

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10 Although still relatively unexplored, based on discussions from previous literature we
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12 propose that reality congruence strongly influences behavioral outcomes. Behavioral outcomes
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14 can be measured by multiple concepts, some of them go beyond actual buying behaviors such as
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16 WOM (i.e., Honora *et al.*, 2024) or satisfaction (i.e., Kim *et al.*, 2012; Liu *et al.*, 2020; Lucia-
17
18 Palacios *et al.*, 2020).

19
20 For instance, Poushneh (2018) supported that augmentation quality significantly
21
22 increases user satisfaction. In addition, the design of experiences can also influence consumers'
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24 WOM (Zhang *et al.*, 2021). Translating this into the context of the current study, reality
25
26 congruence can be linked to creating more satisfying and loyal (e.g., WOM) experiences. Thus,
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28 we propose:

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33 **H4a:** *Reality congruence positively influences satisfaction.*

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35 **H4b:** *Reality congruence positively influences WOM.*

36 37 3.3. *Immersion, satisfaction, and WOM*

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39 According to Witmer and Singer (1998), immersion is a psychological state that involves
40
41 someone to be enveloped by an environment of constant stimulation and experiences. AR is
42
43 continuously evolving **toward** ever more immersive experiences. Both headsets and apps aim to
44
45 create a high degree of immersion to increase value across the customer journey (tom Dieck and
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47 Han, 2021). The concept of immersion involves escaping reality, detaching from the real world,
48
49 and forgetting about everyday concerns (Hudson *et al.*, 2019). The more realistic AR experiences
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51 become, the more likely consumers feel fully immersed, which in turn influences their
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53 experience (tom Dieck and Han, 2021).
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3 Bae *et al.* (2020) found that within a branding context, immersion positively influences
4 satisfaction when using mixed reality experiences. In another immersive technology context, Wu
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8 *et al.* (2020) identified that a strong degree of immersion influences tourists' experiential VR
9
10 satisfaction. Consequently, consumers who felt a sense of entering a different world and fully
11
12 immersing themselves in experiences tend to be more satisfied. Interestingly, some studies came
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14 to different conclusions and argued that this is highly context but also application specific. For
15
16 instance, Li *et al.* (2023) studied the tourism context and failed to find a significant influence
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18 from immersion to satisfaction. One argument for this could be the design of experiences and
19
20 lack of immersive elements will influence the degree of consumer satisfaction. This means that
21
22 although the paths from immersion to satisfaction seems to be well established as discussed
23
24 above, it is necessary to incorporate and confirm the importance within the AR marketing
25
26 context, especially considering that research has long argued that the degree of immersion highly
27
28 influences the success of application design (Balapour *et al.*, 2023). Thus, we propose:
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33 **H5a:** *Immersion positively influences satisfaction.*
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36 Within the context of mobile gaming, Zhou *et al.* (2022) could not confirm a significant
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38 effect of immersion toward behavioral intentions and argued that immersive features in
39
40 applications are often complex and multi-faceted. Nonetheless, flow, the degree of how far a
41
42 consumer is immersed in an experience, has often been found to strongly influence consumers'
43
44 intention to spread WOM (e.g., Quach *et al.*, 2022). Their study on shopping experiences found
45
46 that highly immersed consumers entered a state of flow that led them to engage with positive
47
48 WOM. Therefore, we propose:
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52 **H5b:** *Immersion positively influences WOM.*
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54 3.4. Moderation: Utilitarian versus hedonic AR experiences 55 56 57 58 59 60

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3 As discussed above, consumers develop different feelings and perceptions about an
4 experience based on the context they are experiencing (Akdim *et al.*, 2022). For instance,
5 hedonic experiences are concerned with intrinsic motivation, leading to experiences perceived as
6 enjoyment-oriented, fun, and exciting (Picot-Coupey *et al.*, 2021). This includes elements of
7 real-time experiences that incorporate features such as playfulness to trigger a users' rational and
8 emotional responses, i.e., user engagement (Saleem *et al.*, 2022). In the retail context, Hilken *et*
9 *al.* (2017) proposed AR interactions positively influence customers' satisfaction and hedonic
10 perceptions of online service experiences. Overall, AR increases experiential enjoyment in
11 consumption experiences, such as the ability to access enhanced information or explore more
12 visually engaging content. Therefore, AR can elevate the online experience (Hilken *et al.*, 2017).
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26 Utilitarian experiences are concerned with extrinsic motivation of performing an action,
27 such as gaining benefits in terms of convenience in information retrieval and seeking (Picot-
28 Coupey *et al.*, 2021). Jessen *et al.* (2020) reported AR is increasingly being used in the early
29 stages of gathering information. Applications such as Sephora Virtual Artist App³ or Wanna
30 Kicks all focus on providing consumers with enhanced information and experiences to make an
31 informed, efficient purchase decision (Rauschnabel *et al.*, 2019). As such, these technologies
32 provide utilitarian value as part of the consumption experience. Compared to other digital
33 technologies, AR can be easily integrated into users' daily lives and shopping behaviors because
34 of ubiquitous smartphone technologies. Therefore, it is easily accessible to a large number of
35 consumers, adding value to their customer journey through an overlay of realistic, relevant, and
36 in-time information (Barhorst *et al.*, 2021; Sung, 2021).
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56 ³ <https://www.sephora.sg/pages/virtual-artist>
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3 Putting this into perspective, it is anticipated that the effects from the perceived
4 tangibility of the experience (person-VE interaction) and the feeling of experiencing something
5 new (novelty) toward reality congruence and immersion and ultimately satisfaction and WOM
6 vary according to the context (hedonic/utilitarian) of the AR experience (c.f. Akdim *et al.*, 2022).
7
8 Thus, we propose the following hypothesis:
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14 **H6:** *The modeled relationships are moderated by different AR value experiences*
15 *(utilitarian vs. hedonic).*
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19 This study therefore proposes a comprehensive model that investigates how different AR
20 characteristics (person-VE interaction, novelty) impact reality congruence and immersion, which
21 ultimately lead to satisfaction and WOM (Figure 1). These relationships are proposed for two
22 AR experiences: AR-UV and AR-HV. Based on extant literature, the constructs were chosen to
23 bridge the gap of under researched AR value characteristics. For example, Zanger *et al.* (2022)
24 found although affective responses improved WOM, AR does not guarantee more positive
25 affective responses as it heavily depends on technical AR features. The current study examines
26 person-VE interaction, reality congruence, and immersion as part of technical AR features.
27 Moreover, to date, studies have failed to examine these characteristics holistically to determine
28 their impact on different AR experiences (e.g., hedonic vs. utilitarian). Thus, additional research
29 confirming the impact of these AR features on WOM is necessary for more conclusive findings.
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44 Considering satisfaction, Kim *et al.* (2021) positioned AR as enabling brands to deliver
45 additional value, including novelty, which in turn shapes customer satisfaction. The research
46 further posits that a brand's innovative use of novel technologies positively impacts their
47 satisfaction, immersion, and WOM. In addition, Chen *et al.* (2022) added novelty as a key
48 component of the extended customer experience to measure perceptions of AR apps. Overall,
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3 satisfaction and WOM remain important variables within marketing and especially recent literature
4
5 explores these two constructs as dependent variables (Zalloum *et al.*, 2019).
6
7

8 *[Insert Figure 1 about here]*
9

10 **4. Methodology**

11 *4.1. Data collection and procedure*

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14 The research procedure involved online surveys in the USA administered by Prolific.
15
16 Participants had to be US citizens and over the age of 18. Upon accessing the survey, participants
17
18 were randomly assigned to and only engaged with one of the AR experiences (hedonic vs.
19
20 utilitarian; see [the Appendix](#)). The randomization was completed in Prolific.
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24 Participants were able to access the survey via any device including laptops, desktops,
25
26 and smartphones. Data collection took place over a two-week period and the average survey
27
28 completion time was between 9 and 10 minutes. Once participants started the survey, they were
29
30 asked to engage with their AR app for around 30 seconds. The AR-UV experience included a
31
32 utilitarian AR app called Wanna Kicks ⁴, a virtual shoe allowing participants to try-on and
33
34 review information and choice of green sneakers. The AR-HV experience featured a hedonic AR
35
36 app called ARVid⁵. During this experience, a deer appeared, made noises, and moved around in
37
38 the user's direct surroundings. These two applications were chosen as they had distinctive
39
40 features in terms of providing utilitarian and hedonic content as confirmed by statistical analysis
41
42 (see section 5.3). Specifically, the Wanna Kicks offered information facilitating the decision-
43
44 making process and ARVid offered an enjoyable, fun experience. Comparable methods have
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54 ⁴ <https://apps.apple.com/us/app/wanna-kicks-ar-shoes-try-on/id1444049305>

55 ⁵ <https://arvid.app/>
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3 been used in other AR marketing studies, including asking participants to choose a dessert from
4 an AR menu and showing AR vs. non-AR videos (Barhorst *et al.*, 2021; Heller *et al.*, 2021).
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6

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8 After engaging with their AR app, participants returned to the online survey to answer
9 questions regarding their AR experiences, constructs of interest, and demographics. Attention
10 checks were placed throughout the survey. For the AR-UV experience, participants had to
11 correctly identify the type of product used in the experience and the primary color. For the AR-
12 HV experience, participants were asked to identify the object depicted in the experience and the
13 specific animal. These attention checks ensured that participants were fully engaged and
14 provided valid survey responses. Participants who did not pass the attention checks were
15 removed from the sample.
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26 Upon removing failed attention checks (11) and incomplete surveys (24), the final data
27 set included 401 responses (54.1% female) that completed either the AR-UV or AR-HV
28 experience. On average, participants were 35 years old ($SD = 12.1$) and have experienced AR
29 before ($M = 4.7$, $SD = 1.6$). For the multi-group analysis, the total data set was separated by AR
30 experience creating two distinct subsamples, i.e., participants completing the AR-UV experience
31 versus the AR-HV experience. A total of 195 participants completed the AR-UV experience.
32 Participants were mainly female (54.4%) with an average age of 35 ($SD = 12.1$). In addition,
33 most participants identified as Caucasian (66.2%), were employed full-time (44.6%), and have
34 experienced AR before (77.4%). For the AR-HV experience, 206 participants completed this
35 experience. Participants were mainly female (53.9%), had an average age of 35 ($SD = 12.1$), and
36 identified as Caucasian (63.1%). In addition, most participants worked full-time (47.6%) and had
37 previous AR experiences (78.2%). Overall, both samples were comparable and representative of
38 the US population (Census, 2021).
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4.2. Measures

To test the conceptual models, several measures were identified from prior literature and adapted to the current AR experiences. All of these items were previously used and validated in studies related to technology usage or AR. Specifically, respondents indicated their level of immersion (Hudson *et al.*, 2019), reality congruence (Kowalczyk *et al.*, 2021), novelty (Barhorst *et al.*, 2021), person-VE interaction (Hudson *et al.*, 2019), satisfaction (Rezaei and Valaei, 2017), and WOM (Hilken *et al.*, 2017; Smink *et al.*, 2020). All items were measured on a seven-point Likert scale (see Table 1).

[Insert Table 1 about here]

4.3. Analysis

We employed partial least squares structural equation modeling (PLS-SEM) to estimate the proposed relationships using *SmartPLS 3* (Ringle *et al.*, 2015). Next, we utilized multi-group analysis (PLS-MGA) to examine potential differences between the AR-UV and AR-HV experiences. Lastly, a robustness check assessed high versus low value conditions for each AR experience. PLS-SEM was the preferred analytical approach due to the exploratory nature of the study, the optimized prediction of dependent variables, small sample sizes for each AR experience comparing high versus low value, and the assessment of PLS-MGA via permutation test (Akdim *et al.*, 2022; Barhortst *et al.*, 2023). We applied the commonly used p-value of less than 0.05 to indicate significance and p-value larger than 0.50 to indicate marginal significance (Hair *et al.*, 2019).

4.4. Common method bias

As the collected data reflected self-reported measures, the influence of common method variance was minimized by separating predictor and criterion variables in the survey and

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3 ensuring respondent's anonymity (Podsakoff *et al.*, 2003). Furthermore, we performed Harman's
4 single-factor test (Podsakoff *et al.*, 2003) and a full collinearity test based on variance inflation
5 factors (Kock, 2015). Harman's single-factor test showed that no single factor accounted for
6 more than 35% of the total variance which is below the acceptable threshold of 50% (Podsakoff
7 *et al.*, 2003). Based on Kock (2015), all variance inflation factor scores were below 2.20
8 indicating that the model can be considered free of common method bias. The procedural and
9 statistical steps indicate no presence of common method bias.

19 **5. Results**

21 *5.1. Measurement model assessment*

23 Measurement model assessment includes the evaluation of internal consistency, indicator
24 reliability, and validity of reflective constructs (Barhorst *et al.*, 2023; Hair *et al.*, 2019). For the
25 total sample, all outer loadings load on their corresponding constructs and are significant ($p <$
26 0.05). Next, composite reliability (CR) values range between 0.865 and 0.959, exceeding the
27 common threshold of 0.70 for the total sample (see Table 1). All average variance extracted
28 (AVE) values are 0.686 or higher and are above the established cut-off value of 0.50 for the total
29 sample. Subsequently, results validate the measurement model's internal consistency and
30 convergent validity.

31 Discriminant validity assessment for the total sample draws on the heterotrait-monotrait
32 (HTMT) ratio of correlation method (Hair *et al.*, 2019). All HTMT ratios are lower than the
33 conservative threshold of 0.85 (Hair *et al.*, 2019). In addition, none of the HTMT confidence
34 intervals include 1 (Table 2). Furthermore, all squared construct correlations are smaller than the
35 corresponding AVEs providing additional support based on the Fornell-Larcker criterion (Fornell

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2
3 and Larcker 1981; Krey *et al.*, 2023). Overall, all results confirm discriminant validity of the
4
5 measurement model.
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8 *[Insert Table 2 about here]*
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10 5.2. Structural model

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12 Before examining the structural model relationships, variance inflation factors (VIF) of
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14 predictor constructs are examined [for the total sample](#). All VIF values range between 1.26 and
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16 2.15 indicating no issues with collinearity as values do not exceed 5 (Hair *et al.*, 2019). Looking
17
18 at the variance explained in each endogenous construct (R^2) (Hair *et al.*, 2019), the model
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20 explains 55.7% of WOM followed by satisfaction, immersion, and reality congruence (Figure 2).
21
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24 The structural model assessment includes one-tailed tests with 5,000 bootstrap
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26 subsamples (Hair *et al.*, 2019). Results indicate that structural relationships express significance
27
28 and importance through the magnitude of their standardized values (Figure 2). Considering the
29
30 effect sizes (f^2) of relationships, all values indicate large and medium effects (Krey *et al.*, 2023).
31
32 The two largest effect sizes are from [person-VE interaction](#) to reality congruence ($f^2 = 0.341$) and
33
34 reality congruence to satisfaction ($f^2 = 0.305$). In contrast, novelty to immersion ($f^2 = 0.030$) has
35
36 the smallest effect size.
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40 Regarding the hypothesized relationships, results support all proposed hypotheses (Figure
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42 2). In line with H1a and H1b, person-VE interaction positively affects reality congruence ($\beta =$
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44 0.500, $p < 0.001$) and immersion ($\beta = 0.367$, $p < 0.001$). In addition, novelty impacts reality
45
46 congruence ($\beta = 0.212$, $p < 0.001$) and immersion ($\beta = 0.134$, $p < 0.05$) confirming H2a and H2b
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48 respectively. Supporting H3, reality congruence positively influences immersion ($\beta = 0.359$, $p <$
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50 0.001). Next, reality congruence has a positive impact on satisfaction ($\beta = 0.497$, $p < 0.001$) and
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52 WOM ($\beta = 0.195$, $p < 0.001$). Therefore, H4a and H4b are supported. Lastly, H5a and H5b are
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3 confirmed as immersion influences satisfaction ($\beta = 0.286$, $p < 0.001$) and WOM ($\beta = 0.403$, $p <$
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5 0.001).
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8 Finally, PLS-Predict with 10-fold and 10 replications is applied to examine predictive
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10 relevance of the model (Hair *et al.*, 2019). Since all Q^2 values exceed zero for the endogenous
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12 constructs, the model's predictive accuracy is confirmed (Figure 2). The root mean squared error
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14 (RMSE) values of endogenous constructs express smaller values for the PLS-SEM method
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16 compared to the linear regression approach. Overall, predictive power is confirmed again.
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20 *[Insert Figure 2 about here]*

21 22 5.3. Multi-group analysis

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24 To analyze potential differences of AR-HV and AR-UV experiences (H6), we implement
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26 PLS-MGA. We utilize the measurement invariance of composite models (MICOM) method to
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28 examine invariance patterns (Barhorst *et al.*, 2023).
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30
31 Prior to completing the analysis, we conducted an independent t-test to assess the level of
32
33 utilitarian and hedonic value elicited in each AR experience based on manipulation check
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35 questions. Results confirm that utilitarian value significantly differs across the two experiences (t
36
37 = 6.69, $df = 399$, $p < 0.001$). Participants expressed higher levels of utilitarian value in the AR-
38
39 UV ($M = 4.9$) compared to the AR-HV experience ($M = 3.9$). In addition, hedonic value also
40
41 significantly differs across the two experiences ($t = 2.92$, $df = 399$, $p < 0.05$) with participants
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43 expressing higher levels of hedonic value in the AR-HV ($M = 4.4$) compared to AR-UV
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45 experience ($M = 3.9$).
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48 49 5.3.1. Measurement invariance

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51 MICOM assessment includes examining configural invariance, compositional invariance,
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53 and equality of composite mean values and variances (Henseler *et al.*, 2016). Administering
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3 identical indicators, treatment of indicator data, and algorithm settings in both AR experiences
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5 established configural invariance. Compositional invariance is examined via c values as
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7 coefficients for indicator effectiveness. All c values are close to 1 and within the 95% confidence
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9 intervals; therefore, compositional invariance is established. Lastly, equality of composite mean
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11 values and variances are examined. Since not all composite mean values and variance ratio
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13 differences are non-significant and some values do not fall between the confidence intervals,
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15 MICOM supports partial invariance (Henseler *et al.*, 2016).
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18 19 5.3.2. Results

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21 PLS-MGA results are summarized in Table 3. Results confirm no differences between
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23 AR-HV and AR-UV experiences regarding the influence of novelty on immersion ($\beta_{AR-HV} =$
24
25 0.089, $\beta_{AR-UV} = 0.188$, $p > 0.1$) and on reality congruence ($\beta_{AR-HV} = 0.280$, $\beta_{AR-UV} = 0.149$, $p > 0.1$)
26
27 or reality congruence on immersion ($\beta_{AR-HV} = 0.347$, $\beta_{AR-UV} = 0.409$, $p > 0.1$), satisfaction (β_{AR-}
28
29 $HV} = 0.449$, $\beta_{AR-UV} = 0.565$, $p > 0.1$), and WOM ($\beta_{AR-HV} = 0.179$, $\beta_{AR-UV} = 0.234$, $p > 0.1$). For
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31 immersion, its influence on WOM ($\beta_{AR-HV} = 0.439$, $\beta_{AR-UV} = 0.334$, $p > 0.1$) does not differ across
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33 experiences; however, its influence on satisfaction is marginally significant and stronger for
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35 hedonic AR experiences ($\beta_{AR-HV} = 0.350$, $\beta_{AR-UV} = 0.182$, $p < 0.1$). In addition, a stronger
36
37 relationship is evident for AR-HV experiences for **person-VE interaction**'s influence on
38
39 immersion ($\beta_{AR-HV} = 0.347$, $\beta_{AR-UV} = 0.212$, $p < 0.05$) indicating the importance of eliciting
40
41 immersion while interacting with virtual environments. Furthermore, **person-VE interaction** has a
42
43 stronger relationship with reality congruence ($\beta_{AR-HV} = 0.339$, $\beta_{AR-UV} = 0.587$, $p < 0.05$) for AR-
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45 UV experiences. Therefore, H6 is partially supported.
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52 *[Insert Table 3 about here]*

53 54 5.3.3. Robustness check

To further examine potential differences between AR-HV and AR-UV experiences, we compare high versus low levels of utilitarian and hedonic value for each experience using PLS-MGA (see Table 4). For the AR-UV experience, a stronger relationship is evident in the low UV condition for the influence of person-VE interaction on reality congruence ($\beta_{\text{low}} = 0.592$, $\beta_{\text{high}} = 0.345$, $p < 0.05$). Therefore, person-VE interaction impacting reality congruence is especially essential in low UV AR experiences. Furthermore, the relationship between novelty and immersion ($\beta_{\text{low}} = 0.082$, $\beta_{\text{high}} = 0.283$, $p < 0.1$) is marginally significant and stronger for the high UV condition. As such, novelty needs to be heightened in high AR-UV experiences to facilitate an immersive experience.

In the AR-HV experience, only one relationship is significantly different. Immersion driving satisfaction ($\beta_{\text{low}} = 0.154$, $\beta_{\text{high}} = 0.409$, $p < 0.1$) is marginally significant and stronger in high HV conditions. High HV experiences can lead to higher satisfaction levels if utilizing immersive tools in AR contexts.

[Insert Table 4 about here]

6. General discussion

This study provides important insights into the use of AR to create value-driven consumer experiences and outcome behaviors. The findings bridge a gap exploring the drivers of satisfaction and WOM for hedonic and utilitarian AR experiences. To date, most studies have considered value as one comprehensive construct. However, limited research has examined differences in hedonic and utilitarian AR experiences (Cranmer *et al.*, 2020; Hoyer *et al.*, 2020). All hypotheses are supported, and findings provide evidence for the proposed relationships across AR marketing experiences.

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3 Interestingly, while established relationships such as novelty to immersion continue to be
4 significant (e.g., Yim *et al.*, 2017), new constructs such as person-VE interaction and reality
5 congruence immerse as stronger influences. Specifically, findings confirm the importance of
6 person-VE interaction in eliciting reality congruence and consequently satisfaction. The
7 relationship between these concepts has received limited attention; therefore, this finding has
8 implications for AR marketing design. Whilst previous studies (c.f. Yoo *et al.*, 2015) examined
9 the link between person-VE and reality congruence on sense of immersion and quality, our
10 findings demonstrate the impact on AR user experience satisfaction. Therefore, the quality of AR
11 content should be prioritized to be accurately realistic to generate an increased sense of presence
12 within the experience, and thus increase users' satisfaction. Compared to technology adoption
13 theories, (i.e., TAM) this study focused on satisfaction as a behavioral outcome, in contrast to the
14 traditional usage behavior, as it can be considered a priority for marketing (Fida and Naz, 2017).
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30 In addition, the traditional concept of novelty as representing a new technology seems to
31 have been replaced with the notion of new forms of customer engagement, a definition which we
32 suggest for future research in this area.
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37 A further contribution of this paper is the comparison of proposed relationships for
38 hedonic and utilitarian AR experiences. Whilst there has been extensive research examining AR
39 experiences, there remains limited research incorporating both utilitarian and hedonic AR
40 experiences (Picot-Coupey *et al.*, 2021). Akdim *et al.* (2022) recently recognized the need to
41 explore the differences between utilitarian and hedonic experiences in the context of social
42 media and confirmed limited differences between the two experiences. The PLS-MGA results
43 reflect significant differences for person-VE interaction's influence on reality congruence and on
44 immersion. While person-VE interaction is more important in eliciting reality congruence in
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3 utilitarian AR experiences, it is more essential in creating an immersive experience for hedonic
4 AR applications. Subsequently, immersion is also more important in hedonic AR experiences
5 when creating satisfactory experiences. These differences need to be considered when creating
6 hedonic or utilitarian experiences in AR. Specifically, this supports Rauschnabel *et al.*'s (2019)
7 claim that within AR marketing, it is essential to create realistic representations of real products
8 to generate similar experience to shopping in-person.
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12 Additionally, this research also investigated high versus low utilitarian/hedonic value
13 conditions. Overwhelmingly, most of the relationship's express importance for all levels of value
14 considering the lack of significant differences. However, results confirm that reality congruence
15 needs to be specifically focused on in low UV experiences. Given limited previous research on
16 reality congruence, this is an important finding and highlights the necessity to include realistic
17 digital content and information within AR apps. This provides important insight for AR
18 marketers and should be used to inform marketing strategy and AR marketing app design
19 decisions.
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24 For utilitarian experiences, novelty is important in eliciting immersion; however, only in
25 high utilitarian value situations. As such, novelty is more essential in driving immersion when
26 the AR experience is utilitarian. These findings provide more detailed insights into AR
27 experiences concerning novelty and immersion beyond previous studies. Here, novelty includes
28 not only the use of novel technology, but also the ability to interact with content in unusual and
29 new ways (Jessen *et al.*, 2020; Uhm *et al.*, 2022). This has important implications for marketing
30 strategy, since novelty is often only associated with the use of new technologies, rather than the
31 provision of novel and engaging experiences. As such AR marketers should focus on updating
32 the utilitarian experiences provided to ensure longevity and continued use. Immersion,
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3 specifically being able to interact with the experience as if it was in the real world, on the other
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5 hand, appears to be the dominant mediator for hedonic AR experiences. From a management
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7 point of view, this demonstrates that marketing applications designed to be used for pleasure are
8
9 much more dependent on highly immersive content. This may lead to the concept of presence
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11 that has not been explored as part of this study but may create even stronger hedonic experiences
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13 (c.f. Daassi and Debbabi, 2021). Finally, according to Alimamy and Al-Imamy (2022), too many
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15 marketing studies have used IKEA Place or other well-established AR apps limiting the
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17 generalizability and understanding of AR experiences. In fact, Sung (2021) suggested that
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19 scholars should test lower cost or non-branded apps. Consequently, the current study focused on
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21 novel AR apps, differentiating between hedonic and utilitarian experiences, to increase
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23 generalizability of findings.
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28 *6.1. Theoretical contributions*

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31 Theoretically, this paper has numerous contributions. First, we applied a utilitarian-
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33 hedonic approach to AR experiences to add to the pool of knowledge on the different consumer
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35 motivations and behaviors when it comes to different types of experiences. Second, we test
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37 drivers of satisfaction and WOM confirming that the paths between person-VE experience and
38
39 novelty toward satisfaction and WOM are mediated by immersion and reality congruence. Next,
40
41 we examine differences across AR-HV and AR-UV experiences. Approaching the theoretical
42
43 model with different experiences allows us to explore how different characteristics of AR
44
45 experiences result in different propositions. Immersion is hereby a strong determinant of
46
47 satisfaction and WOM within the hedonic context. Theoretically, this demonstrates that research
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49 needs to clearly choose or design appropriate conditions. Thus, more immersive experiences are
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51 more likely to create positive WOM.
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3 One of the main empirical contributions is the inclusion of reality congruence within the
4 proposed model as its effects on satisfaction and WOM have not been studied previously.
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6 Especially within the AR context, it is a determinant within both hedonic and utilitarian
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8 experiences yet more essential for utilitarian experiences. Moreover, the focus on novel AR apps
9
10 in this research increases applicability and generalizability of the findings and extends the scope
11
12 of extant literature (Alimamy and Al-Imamy, 2022; Sung, 2021).
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16 17 6.2. *Practical implications*

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19 AR is becoming more popular as an interactive medium for customers to receive
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21 information, co-create value, experience products, and share experiences. Not surprisingly, it is
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23 now considered one of the leading disruptive technologies of today's consumer market
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25 (Rauschnabel, 2021) and a way forward for companies to sell on and provide metaverse
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27 experiences (Chen *et al.*, 2024).
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31 Our findings highlight the differences in expectations of AR experiences. While
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33 consumers seem to use utilitarian applications to browse, choose products and services, possibly
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35 personalize them, and make an actual purchase decision, hedonic experiences appear to be used
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37 when individuals want to become fully immersed in an experience, and thus escape reality. For
38
39 businesses and organizations this highlights the need for full awareness of their marketing
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41 strategy in terms of the intended purpose of an AR app, and the desired user and behavioral
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43 outcomes. Too often is AR adopted in a technology-driven, rather than user-driven approach, and
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45 thus criticism that AR is merely a gimmick when the desired user outcomes are not achieved.
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49 In practical terms this means that retailers and businesses that serve consumers with a
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51 desire for an efficient and quick experience, such as express supermarkets, would benefit with a
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53 focus on basic information such as pricing, origins, supply chain information etc. On the other
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3 hand, entertainment services and retailers, such as toy stores, attract customers that would appear
4 more inclined to engage with immersive experiences and thus, would serve well with the
5 provision of hedonic AR experiences as part of their value adding activities. For instance,
6 bringing content to life through AR gaming not only adds a new dimension to the experience but
7 also creates brand loyalty. Compared to traditional marketing techniques, AR's benefits lie in the
8 voluntary nature of its use by consumers and therefore, only those that want to engage with
9 utilitarian and hedonic content will be required to do so.

10
11
12 Our study provides a clear distinction between offering hedonic or utilitarian experiences
13 and demonstrates that customers show preferences for certain features according to the purpose
14 of the application. Apps that aim to be used for information provision and sales are advised to
15 focus on reality congruence, i.e., AR experience, design, and functionality. Whereas hedonic
16 experiences should emphasize the creation of immersive and engaging experiences to increase
17 customer satisfaction and WOM.

18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 *6.3. Limitations and future research*

34
35 The current research design presents an opportunity to examine relationships within and
36 across conditions using PLS-SEM. However, several limitations emerge. This study offers
37 insights into different types of AR experiences and mirrors the environmental differences outside
38 of the technology world. However, only two different AR experiences were employed offering a
39 multitude of new or examined AR experiences (e.g., Sephora visual artist, Ray Ban AR app) that
40 could be used to replicate the current model. Considering that hedonic and utilitarian value
41 experiences are grounded in retailing (Babin *et al.*, 1994; Picot-Coupey *et al.*, 2021),
42 implementing an AR experience requiring participants to complete an actual purchase could
43 further enhance the current findings.

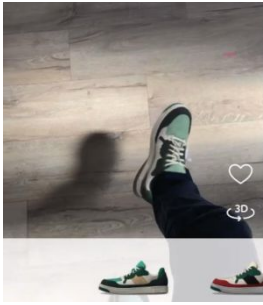
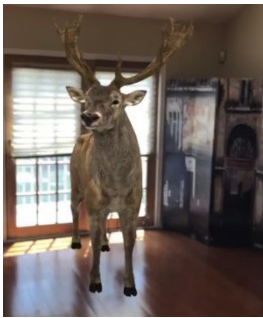
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Furthermore, additional environments beyond AR should be considered. Extrapolating the model to the metaverse (Rauschnabel *et al.*, 2022) would provide insights into value perceptions in this new type of environment. Regarding the current sample, all participants are from the USA. However, hedonic and utilitarian experiences have been extensively examined in different contexts, countries, and cultures (Babin and Krey, 2020). What is currently lacking in AR marketing is a cross-cultural comparison to identify individual differences based on culture or country. These findings would assist in disentangling consumer personality traits associated with culture from factors linked to technology usage or technology familiarity. Furthermore, assessing value beyond the hedonic and utilitarian scope could be beneficial. For example, emotional and epistemic value could enhance the understanding of what drives value in AR experiences. Finally, there will be additional unexplored variables or mediators that can potentially have a significant impact on the AR experiences and outcomes. With the advancement of AR technologies (i.e., headsets that deliver ultrarealistic experiences), the significance of presence is set to grow. Consequently, future research should delve into presence theory, defining presence in the context of AR (i.e., spatial presence) and its impact on user experiences. It will be crucial to understand how different types and degrees of presence influence both utilitarian and hedonic experiences, as well as the resulting behaviors.

Future research is advised to extend the proposed models with up-to-date and context-specific variables to ensure applicability and currency. For example, reuse intention in the future or decision comfort could offer novel insights into AR marketing.

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3 **Appendix. AR experiences**
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Experience	AR application	Description	Example
8 9 10 11 12 13 14 15 16 17	WannaKicks	The app allows users to try on shoes by pointing their smartphone camera toward their feet.	
18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60	ARVid	The app allows users to place animated objects into their own environment and share videos of the experience with others.	

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Table 1. Measurement model results

Constructs and items	Total Sample				AR Hedonic Value Experience				AR Utilitarian Value Experience			
	Loadings	α	CR	AVE	Loadings	α	CR	AVE	Loadings	α	CR	AVE
Person-VE interaction (Hudson et al., 2019)		0.919	0.948	0.860		0.920	0.949	0.862		0.891	0.932	0.821
<i>Thinking about the AR experience, I felt free to:</i>												
Interact with the environment in the AR experience.	0.929				0.930				0.907			
Explore and look where I wanted.	0.920				0.913				0.916			
Move around in the environment.	0.932				0.943				0.895			
Novelty (Barhorst et al., 2021)		0.894	0.925	0.756		0.917	0.940	0.798		0.858	0.901	0.698
This AR experience was a new experience for me.	0.850				0.875				0.785			
This AR experience was a unique experience for me.	0.923				0.933				0.905			
This AR experience was a different experience for me.	0.922				0.926				0.916			
This AR experience was an unusual experience for me.	0.774				0.836				0.718			
Reality congruence (Kowalczyk et al., 2021)		0.948	0.959	0.795		0.948	0.959	0.796		0.926	0.942	0.732
The AR app presents virtual content impressively.	0.896				0.904				0.853			
Overall, I find that the AR app presents virtual content attractively.	0.921				0.935				0.886			
The design of the virtual content is visually pleasant.	0.901				0.902				0.885			
The AR app presents virtual content visually appealingly.	0.932				0.931				0.912			
The AR app presents the design of the virtual content realistically.	0.846				0.827				0.809			
The AR app presents virtual content as if it was real.	0.848				0.848				0.781			
Immersion (Hudson et al., 2019)		0.773	0.865	0.686		0.825	0.895	0.740		0.751	0.853	0.667
I could interact with the content in the AR experience as if I was in the real world.	0.886				0.859				0.904			
I felt completely immersed.	0.923				0.917				0.917			

1	I forgot about my everyday concerns.	0.650			0.800				0.585				
2													
3	Satisfaction (Rezaei & Valaei, 2017)		0.939	0.953	0.804		0.940	0.955	0.808		0.933	0.949	0.788
4	Dissatisfied - satisfied	0.910				0.911				0.901			
5	Displeased - pleased	0.927				0.907				0.942			
6	Unfavorable - favorable	0.928				0.938				0.907			
7	Frustrated - content	0.855				0.847				0.859			
8	Terrible - delighted	0.860				0.888				0.824			
9													
10	WOM (Hilken et al., 2017; Smink et al., 2020)		0.918	0.941	0.801		0.939	0.956	0.845		0.893	0.925	0.756
11													
12	<i>I would like to:</i>												
13	Talk about this AR experience with friends, family, or colleagues.	0.907				0.904				0.902			
14													
15	I would recommend this AR experience to someone who seeks my advice.	0.923				0.934				0.912			
16													
17	Share content from this AR experience via social media.	0.829				0.905				0.757			
18													
19	Share content from this AR experience with a friend.	0.918				0.933				0.897			
20													
21													

Note: CR = Composite reliability; AVE = Average variance extracted.

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Table 2. Discriminant validity assessment

	Person-VE interaction	Novelty	Reality congruence	Immersion	Satisfaction	WOM
Person-VE interaction	<i>0.927</i>	0.389	0.582	0.628	0.600	0.660
Novelty	0.406 [0.29; 0.50]	<i>0.870</i>	0.406	0.423	0.386	0.406
Reality congruence	0.621 [0.56; 0.69]	0.418 [0.32; 0.51]	<i>0.891</i>	0.627	0.677	0.622
Immersion	0.693 [0.62; 0.76]	0.470 [0.38; 0.57]	0.688 [0.62; 0.75]	<i>0.829</i>	0.598	0.679
Satisfaction	0.636 [0.56; 0.71]	0.393 [0.29; 0.49]	0.708 [0.66; 0.77]	0.662 [0.56; 0.79]	<i>0.897</i>	0.630
WOM	0.706 [0.64; 0.77]	0.417 [0.31; 0.52]	0.652 [0.59; 0.71]	0.772 [0.72; 0.83]	0.663 [0.57; 0.73]	<i>0.895</i>

Note: Main diagonal (\sqrt{AVE}) in italic and upper triangular matrix (Pearson correlation) present the Fornell-Larcker criterion. The lower triangular matrix presents the **heterotrait-monotrait (HTMT) ratio** of correlations and confidence intervals.

Table 3. Multi-group test results

Paths	Standardized estimate (AR-HV)	Standardized estimate (AR-UV)	Difference
Person-VE interaction → Reality congruence	0.339	0.587	-0.248**
Person-VE interaction → Immersion	0.347	0.212	0.226**
Novelty → Reality congruence	0.280	0.149	0.131 ^{ns}
Novelty → Immersion	0.089	0.188	-0.100 ^{ns}
Reality congruence → Immersion	0.347	0.409	-0.063 ^{ns}
Reality congruence → Satisfaction	0.449	0.565	-0.116 ^{ns}
Reality congruence → WOM	0.179	0.234	-0.055 ^{ns}
Immersion → Satisfaction	0.350	0.182	0.168*
Immersion → WOM	0.439	0.334	0.105 ^{ns}

Note: ns = not significant; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.001$.

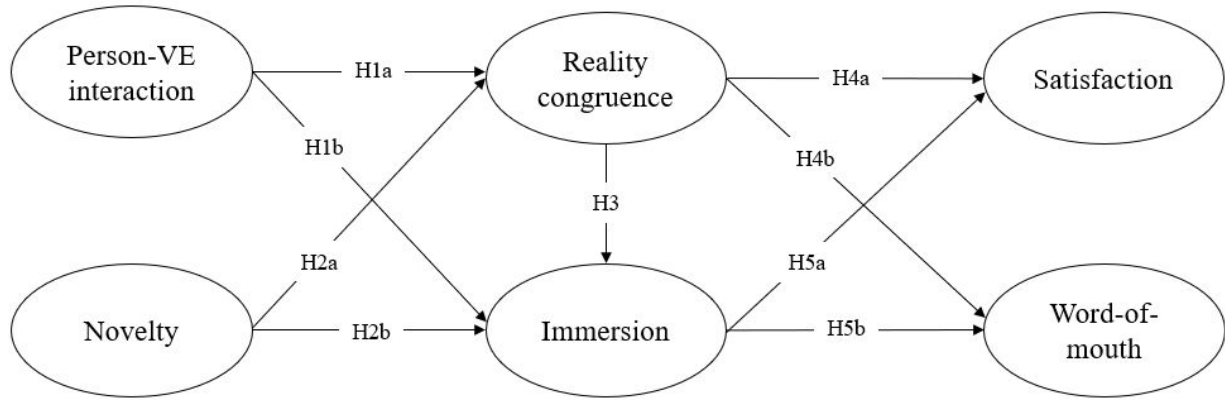
Table 4. Multi-group test results comparing high vs. low value for AR-UV and AR-HV

Paths	AR-UV (high vs low UV)			(AR-HV (high vs low HV))		
	Standardized estimate (low value)	Standardized estimate (high value)	Difference	Standardized estimate (low value)	Standardized estimate (high value)	Difference
Person-VE interaction → Reality congruence	0.592	0.345	0.247**	0.170	0.290	-0.119 ^{ns}
Person-VE interaction → Immersion	0.253	0.197	0.056 ^{ns}	0.380	0.410	-0.029 ^{ns}
Novelty → Reality congruence	0.092	0.200	-0.108 ^{ns}	0.330	0.248	0.082 ^{ns}
Novelty → Immersion	0.082	0.283	-0.202*	0.113	0.153	-0.039 ^{ns}
Reality congruence → Immersion	0.432	0.272	0.160 ^{ns}	0.201	0.287	-0.086 ^{ns}
Reality congruence → Satisfaction	0.472	0.460	0.011 ^{ns}	0.488	0.298	0.190 ^{ns}
Reality congruence → WOM	0.319	0.085	0.234 ^{ns}	0.139	0.136	0.004 ^{ns}
Immersion → Satisfaction	0.279	0.072	0.208 ^{ns}	0.154	0.409	-0.255*
Immersion → WOM	0.266	0.394	-0.128 ^{ns}	0.364	0.465	-0.101 ^{ns}

Note: ns $p > 0.10$; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.001$.



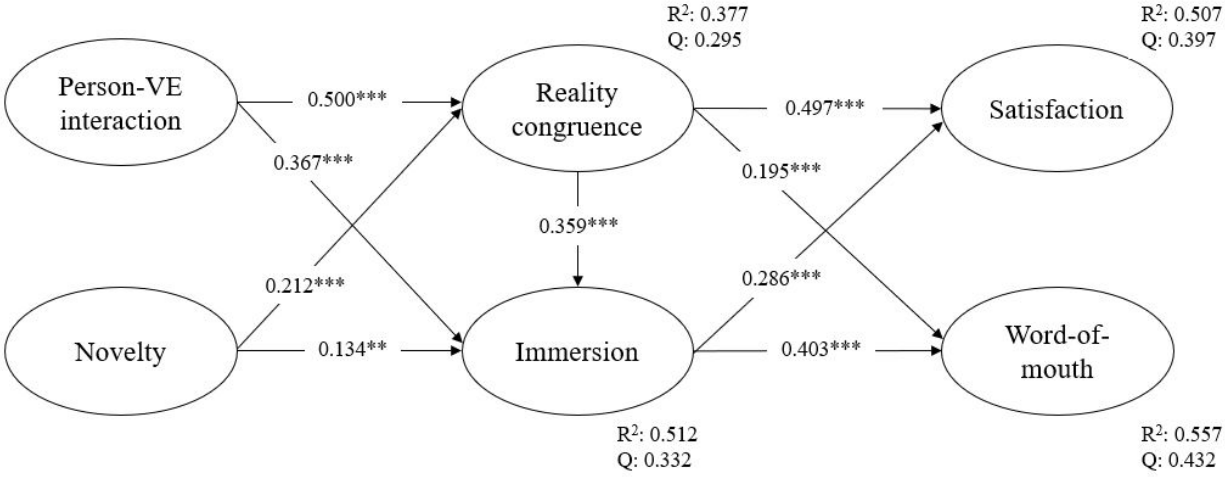
Figure 1. Conceptual model



H6: Moderator – hedonic vs. utilitarian AR experience.

Internet Research

Figure 2. Structural model results



* p < 0.1; ** p < 0.05; *** p < 0.001

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