Advances in Consumer Research
ISSN (Print): 0098-9258
ISSN(Online): 3079-1766

Vol. 2, Issue 4 (2025) https://acr-journal.com/

Augmented reality and purchase intention: How technological mediums elicit consumers' perception of self-uniqueness

Chun-Ming Chang[1], Yun-Hao Sung[2*], Chia-Hui Yen[1], Meng-Hsiang Hsu[3]

[1]Department of International Business, Ming Chuan University, Taiwan

Email ID: chunming@mail.mcu.edu.tw / Email: chyen@mail.mcu.edu.tw

[*2]College of Management, National Kaohsiung University of Science and Technology, Taiwan

Email ID:

[3]Department of Information Management, College of Management, National Kaohsiung University of Science and Technology, Taiwan

Email ID: mhhsu@nkust.edu.tw

***Corresponding Author:**

Yun-Hao Sung

Email ID: kssung628@gmail.com

Cite this paper as: Chun-Ming Chang, Yun-Hao Sung, Chia-Hui Yen, Meng-Hsiang Hsu, (2025) Augmented reality and purchase intention: How technological mediums elicit consumers' perception of self-uniqueness. *Advances in Consumer Research*, 2 (4), 2794-2809

KEYWORDS

augmented reality, relative advantage, self-uniqueness, needs–affordances–features, uses and gratifications theory

ABSTRACT

Drawing on the perspectives of needs–affordances–features (NAF) and uses and gratifications theory (UGT), this study proposed a research model to understand the relationships between AR affordances (interactivity, vividness, and augmented reality), self-uniqueness, relative advantage, and purchase intention. Data collected from 264 participants were used to test the proposed model. The findings reveal that interactivity and vividness impact augmented realism positively, which in turn affects relative advantage and self-uniqueness. Our results also show relative advantage and self-uniqueness are the antecedents of purchase intention, while relative advantage has a positive impact on self-uniqueness. The implications of these results are discussed.

1. INTRODUCTION

Owing to the rapid development in technologies and diffusion of mobile devices, augmented reality (AR), which allows virtual elements to be merged with the real environment (Barta et al., 2023), has become an emerging technology that enables companies to present their products virtually to enhance customers' perception of the real product in the customer journey of the purchase decision (Hinsch et al., 2020; Kowalczuk et al., 2021). AR can thus help customers reduce product fit uncertainty and product performance uncertainty to facilitate their purchase intention (Barta et al., 2023). Firms, on the other hand, can increase their brand awareness, promote product features, and create customer desires by implementing AR applications (Kunkel et al., 2016). As such, AR has attracted a lot of attention from both customers and retailers(McLean & Wilson, 2019) and has been treated as an effective technology that can be incorporated into firms' marketing strategies (Hinsch et al., 2020). According to a survey conducted by the International Data Corporation (IDC) in 2022, global spending on AR is USD 14.67 billion in 2021 and is expected to reach USD 74.73 billion by 2026 (IDC, 2022). Accordingly, it is important to examine the impact of AR features on purchase intention.

Extant research has begun to study the influence of AR on customers' purchase intention from a variety of perspectives extensively. Most AR studies have found that AR technology features will impact consumer cognition and affective response, which in turn affects purchase behavior (e.g., Barta et al., 2023; Uhm et al., 2022; Yim et al., 2017). Despite their studies have revealed several useful insights, little research has assessed how a AR-system can satisfy customers' psychological needs (e.g., self-uniqueness) to lead to purchase decision-making. According to uniqueness theory (Snyder, 1992; Snyder & Fromkin, 1977), people tend to fulfill their desire for uniqueness through various actions. In marketing context, researchers

also found that uniqueness is an essential motivator of consumer purchasing behavior (Chan et al., 2015; Kauppinen-Räisänen et al., 2018; Shaikh et al., 2017; Shao et al., 2019). Generally, AR can be viewed as a new medium for demonstrating product features and related information. It also allows users to customize their physical surroundings visually (Alimamy & Gnoth, 2022; Hilken et al., 2017) and enrich information about the physical environment actors need (Raja & Calvo, 2017). Thus, AR may fulfill an individual's needs of uniqueness because using AR systems may enable he/she to feel that are different from others in their group. Yet, the role of self-uniqueness in the AR context is still overlooked.

Our study aims to address this research gap by investigating the reasons behind purchasing intentions employing the perspectives of needs–affordances–features (NAF) (Karahanna et al., 2018). and uses and gratifications theory (UGT) (Katz et al., 1973). UGT asserts that people are goal-oriented and will choose specific media to satisfy their needs for gratification (Katz et al., 1973; Xu et al., 2019), while NAF also posits that technological affordances will fulfill users' needs. Taken together, we may reasonably argue that AR affordances are the critical factors that may affect customers' needs gratifications, which in turn impacts purchase intention. Especially, in this study, AR affordances are divided into three different types–interactivity, vividness, and augmented realism. Customer needs, on the other hand, are classified into self-uniqueness and relative advantage.

In summary, the main purpose of this study is to integrate the perspectives of UGT and NAF to identify the influence of AR systems on customers' purchase intention. This study attempts (1) to understand the impact of interactivity and vividness on augmented realism, (2) to examine the effect of augmented realism on the need for uniqueness and relative advantage, and (3) to test the influences of self-uniqueness and relative advantage on purchase intention. The results are expected to provide theoretical and empirical insights into the role of AR in the retailing context.

2. THEORETICAL BACKGROUND

2.1 Prior literature on the link between augmented reality and purchase intention

Given that AR is one of the critical technologies that could transform customer purchase behavior (Flavián et al., 2019; Uhm et al., 2022), AR has captured the attention of researchers and thus the impact of AR technology on customers' purchase intention has been examined extensively. For example, Barta et al. (2023) found that AR can help consumers avoid cognitive dissonance by helping them more easily identify differences between product options. Sun et al. (2022) reported that AR features can reduce customer perceptions of product uncertainty and thus lead to a positive product attitude. Wang et al. (2022) found that AR technological features (e.g., interactivity, vividness, augmentation, and aesthetic) will impact social presence, which in turn affects customers' flow state and purchase intention. Uhm et al. (2022) revealed that AR technology could improve consumers' perceptions of diagnosticity, which in turn positively affects psychological distance and risk perception. Psychological distance and risk perception, on the other hand, impact purchase intention of e-commerce products.

In addition, Yim et al. (2017) posited that immersion mediates the relationship between AR features (interactivity and vividness) and two types of outcomes (e.g., usefulness and enjoyment), which in turn shapes customers' attitude toward media and purchase intention. Based on cognition-affect-conation framework, Qin et al. (2021) found that virtual presence, experiential value, and shopping benefits have positive impacts on attitude, which in turn affects satisfaction and purchase intention. Chen and Lin (2022) demonstrated that augmented realism and technology fluidity influence consumers' flow experience strongly, which in turn increase purchase intention.

While prior research on AR has provided valuable insights into the antecedents of purchase intention, most studies have primarily focused on how AR technology assists consumers in gathering product information to facilitate decision-making performance and how AR triggers customers' emotional reactions. This implies that fulfilling utilitarian needs and emotional value are a key driver of consumers' motivation to purchase products in the AR setting. However, past studies indicate that people often adopt novel technologies to satisfy their need for uniqueness (Abosag et al., 2020; Yu et al., 2016), indicating that such psychological needs may play a crucial role in triggering purchase intentions. Yet, the role of the uniqueness needs in the AR context remains under explored. To fulfill this knowledge gap, we integrate NAF and UGT aspects to develop a research model to understand the role of uniqueness needs in the AR context to explain why consumers opt for AR technologies to support their purchasing decisions.

2.2 The importance of needs gratifications

The uses and gratifications theory (UGT) asserts that people are goal-oriented and will choose specific media to satisfy their needs for gratification (Katz et al., 1973; Xu et al., 2019). UGT explains how users select media that will satisfy given needs and allow them to enhance their understanding of specific goals. UGT theory is widely used to understand users' needs and obtain gratifications when they decide to use a specific technology. For example, Chiang (2013) found that social interactivity and playfulness are two key motivational needs that affect users' attitudes toward social media and impact their continuous intentions. Xu et al. (2019) demonstrated that the audience's socialization and assistance needs are important antecedents of intimacy (likes) and interaction (comments) on social media. Chang (2018) revealed that social and emotional gratifications are antecedents of continuance intention toward social media. On the other hand, Ray et al. (2019) found that gratifications such as searching for a restaurant, ease of use, and customer experience are predictors of the intention to use food delivery

services. Huang and Hsieh (2011) suggested that entertainment is a gratification that drives users' loyalty toward online games. In the context of AR, Smink et al. (2022) classified gratifications into different types, such as hedonic, utilitarian, social, and technology-based gratifications, and examined the influence of gratifications on customer satisfaction.

Although the above studies have proposed a variety of needs gratifications for using technologies in different contexts, the use of AR technologies may lead to new types of gratification due to the different nature of technologies and usage goals (Smink et al., 2022). In this study, we aimed to identify new types of gratification that could motivate customers' purchase intentions. As mentioned earlier, AR is a new technology that can help customers view and try products before making a purchase decision (Barta et al., 2023; Smink et al., 2019). Customers can thus reduce the cognitive load during the online product search process and make decisions based on the appearance of the product integrated into the real world (Barta et al., 2023). Previous research has found that fulfilling utilitarian needs (making purchase decisions more efficiently and confidently) is the most important factor motivating customers to use AR apps (Dacko, 2017; Salo et al., 2013; Scholz & Duffy, 2018). Similarly, Kowalczuk et al. (2021) argued that customers can use AR to gather product information and increase their confidence in their choices. Perceived usefulness could be a cognitive gratification that drives users' usage intentions (Kowalczuk et al., 2021; Rauschnabel, 2018). Previous studies suggest that relative advantage, the extent to which an innovative technology performs better than existing technologies (Jiang et al., 2021), is similar to the aspect of usefulness (Davis, 1989; Jiang et al., 2021). Thus, in this study, we considered relative advantage as a factor reflecting the degree to which AR technology can meet customers' cognitive needs.

On the other hand, researchers posit that psychological needs is also a viral antecedent of behavioral intention (Karahanna et al., 2018). Although there may be many types of psychological needs for using AR technology, such as enjoyment (Smink et al., 2022), the need for uniqueness is a vital factor affecting an individual's intention to use information technologies (Choi & Kim, 2016). This is because users may need to create optimal distinctness with others to build their self-image (Yu et al., 2016). According to the uniqueness theory proposed by Snyder and Fromkin (1977), people with a high level of need for uniqueness generally need to see themselves as different and unique from members of their social group (Abosag et al., 2020). People usually maintain their uniqueness by purchasing luxury goods (Kauppinen-Räisänen et al., 2018) and using specific technologies (Choi & Kim, 2016; Yu et al., 2016; Gong et al., 2020), because they need to improve their self-image they want others to see (Tian et al., 2001). Thus, in this study, self-uniqueness was expected to impact users' intention to use AR technologies to make purchase decisions.

2.3 The role of AR technological affordances

While UGT is a useful aspect that can be used to explain the needs gratification and purchase intention in the AR context, it is still limited in addressing the impact of AR technological features on purchase intention. Thus, it is necessary to introduce additional theory as the foundation for exploring the roles of technological features in AR setting. In this study, the aspect of NAF is employed to supplement the UGT to explore the links between AR technological features and needs gratification. NAF asserts that people will be motivated to use technology to satisfy their needs (Karahanna et al., 2018), indicating that affordances of technology are the key drivers of gratification needs. According to past research (Nam et al., 2024; Sin, 2022), affordance refers to an object that allows individuals to use it to perform a specific behavior. Researchers also agreed that affordances provide functional features that enable individuals to perform their actions to achieve the expected outcomes (Hutchby, 2001; Fang, 2019). In the context of online shopping, sellers could employ online product presentation technologies (e.g., augmented reality) to allow customers to gather product information prior to purchase (Vonkeman et al. 2017). Thus, presence, the capability of a media which produces accurate representations of objects and could enable people to feel like real objects, has been treated as a vital feature of augmented reality (Chen & Lin, 2022; Shin, 2022). Researchers also suggested that presence can be conceptualized as augmented realism (Chen & Lin, 2022). Accordingly, we may consider that augmented realism is a key technology feature of AR. This standpoint is consistent with Javornik et al. (2016). In addition, while researchers have suggested many technological features of AR (e.g., interactivity, vividness, augmentation, aesthetic, environmental embedding, simulated physical control) (Fan et al., 2020; Wang et al., 2022), interactivity and vividness are the two critical technology features facilitating online product presence (Vonkeman et al. 2017). Yim et al. (2017) also agreed interactivity and vividness are the critical features of AR technology. Thus, interactivity and vividness are treated as the critical technological affordances of AR technology that can facilitate augmented realism affordance.

Interactivity refers to the degree of interaction between users and the virtual content and/or objects presented by AR technologies (Arghashi & Yuksel, 2022; Ho et al., 2022). Interactivity is a vital feature of AR technology (Wang et al., 2022), because it represents the extent to which users can easily use AR to interact with virtual content and reflects their perception of AR capabilities, such as speed, control, and range of content (Yim et al., 2017). Vividness, on the other hand, refers to the capabilities provided by a technology that could be used to produce a sensory-rich mediated environment (Yim et al., 2017). Vividness can thus be interpreted as the aesthetic appeal and representational quality of products and information (Yim et al., 2017; Ho et al., 2022).

In addition, augmented realism refers to the functional feature of AR, which allows customers to perceive that virtual objects are experienced as actual objects in the physical environment (Chen & Lin, 2022; Smink et al., 2020). That is, high levels of augmentation realism capability may enable consumers to feel that their AR interaction experiences are authentic and situated

(Chen & Lin, 2022; Hilken et al., 2017). Thus, augmented realism affordance reflects a key attribute of AR because it can help customers determine their perceived product use outcomes (Chen & Lin, 2022).

As outlined above, AR enables customers to offload mental imagery through virtual presentation of a product (McLean & Wilson, 2019). Thus, AR provides vivid virtual product presence and interactive features for customers to evaluate products before making purchase decisions (McLean & Wilson, 2019). Interactivity, vividness, and augmented realism are thus considered as vital affordances of AR technology.

3. RESEARCH MODEL AND HYPOTHESIS DEVELOPMENT

Based on the above literature, a research model was developed to examine the impact of AR technology on purchase intention (Figure 1). In the model, we argue that interactivity and vividness will impact augmented realism, which may influence self-uniqueness and relative advantage. On the other hand, self-uniqueness and relative advantage will positively affect purchase intention, whereas relative advantage is the predictor of self-uniqueness.

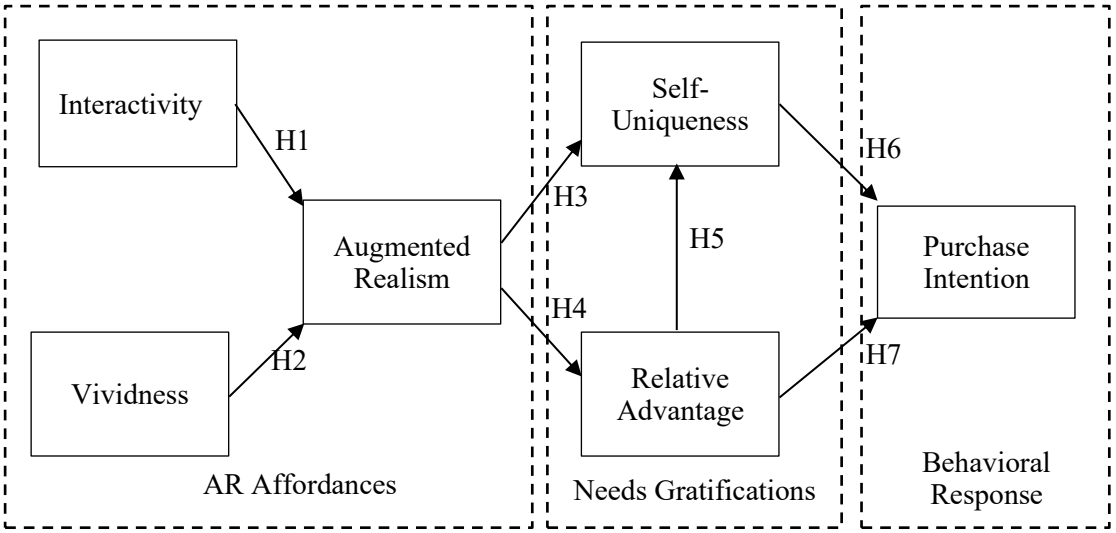

Figure 1. Research model

Interactivity refers to the capability of media allowing users to control and mutual communication (McMillan & Hwang, 2002; Park & Yoo, 2020). Generally, a highly interactive interface of AR will impact one's perception about the product presentation (Mollen & Wilson, 2010; Vonkeman et al., 2017). The judgment of interface reality in the context of AR technology would influence users' cognitive absorption experience (treating virtual augmented objects as components of reality) (Chen & Lin, 2022). That is, AR-based product presentations may enable users to have para-authentic product experiences (Lee 2004; Yim et al., 2017). Vonkeman et al. (2017) found that interactivity is the antecedent of product presence. Thus, we may propose the following hypothesis.

H1. Interactivity is positively related to augmented realism.

Generally, vividness can enrich the quality of information provided by AR by increasing the number of sensory dimensions (McLean & Wilson, 2019). Researchers argue that a vivid display of products influences product presence (Wang et al., 2022) and consumers' cognitive processing (Keller & Block, 1997; McLean & Wilson, 2019). Vivid presentations can facilitate product comprehension (Feiereisen et al., 2008) thus attract consumers' attention to the product (Shiv & Huber, 2000). Many studies have shown that the perceived authenticity of virtual objects helps decrease the uncertainty of products and enhances the perceived value of AR applications (Parker et al., 2016; Hilken et al., 2017; Yoon & Oh, 2022). Ho et al. (2022) found that AR mobile apps with a highly distinct vividness significantly stimulated the experience of spatial presence. Kim et al. (2023) found that the vividness of the AR experience directly increased the sense of presence. Vonkeman et al. (2017) further revealed that vividness could facilitate product presence. Therefore,

H2. Vividness is positively related to augmented realism.

According to Belk (1988), self-uniqueness depends on the suitability of products with customers' self-conditions, needs, style, and aesthetic views. Self-uniqueness, on the other hand, represents an expression of individuality rather than a simple difference between products (Karagöz & Uysal, 2022). In the study, AR allows consumers to customize their physical surroundings (Alimamy & Gnoth, 2022; Hilken et al., 2017) and enrich information about the physical environment that consumers need (Raja & Calvo, 2017) within the consumption experience. Try on products using augmented reality will allow users to share their novel shopping experience with peers technology (McLean & Wilson, 2019). Researchers argued

that people tend to seek novelty to pursue uniqueness (Roehrich, 2004; Gong et al., 2020). Building on the above arguments, we propose the following hypotheses:

H3. Augmented realism is positively related to self-uniqueness.

AR technologies provides an augmented environment for customers to interact with various products to obtain product information (Wang et al., 2022). Past research argued that product presence feature of AR technologies will help customers to reduce product risk when purchasing online, because the product is expected to be presented physically with customers and allows them to accurately evaluate products online (Vonkeman et al., 2017). In this sense, AR may enhance the perceived usefulness of a technology (McLean & Wilson, 2019). Oyman et al. (2022) also found that perceived augmented realism positively affects perceived usefulness. Yoon & Oh (2022) suggested that high-quality AR increases users' perceived usefulness of the technology. Therefore,

H4. Augmented realism is positively related to relative advantage.

Prior literature also argues that self-uniqueness enhancement depends on how an individual acquires symbolic meaning by purchasing a product or engaging with a brand (Abosag et al., 2020). In the context of product consumption, researchers also found that people with a greater need for uniqueness tend to purchase unique and rare material goods to express their unique characteristics (Kauppinen-Räisänen et al., 2018). In the technology use context, researchers suggested that technology may be used to reflect personal characteristics (Choi & Kim, 2016; Morrison & Johnson, 2011). AR systems, as method earlier, may amplify visual richness and product presentation and will thus impacts subsequent evaluations of products (Kirillova & Chan, 2018; Wagler & Hanus, 2018). Accordingly, we may expect that one's desire for uniqueness can be fulfilled when he/she perceives that AR is innovative technology and can help them improve performance of product evaluation tasks (Kowalczuk et al., 2021). Therefore, this study posits that the relative advantage may enhance self-uniqueness.

H5. Relative advantage is positively related to self-uniqueness.

Uniqueness is a vital factor in guiding an individual's behavioral intentions (Tian et al., 2001). Generally, an individual with a high need for uniqueness tends to avoid similarity with others in order to express their own personal image (Choi & Kim, 2016; Tian et al., 2001). Kauppinen-Räisänen et al. (2018) argued that the need for self-uniqueness was related to self-expression. Sheehan & Dommer (2020) also pointed out that consumers' pursuit of self-uniqueness for constructing self-identity leads them to choose products that match their identities or styles while avoiding inconsistent products and brands. Thus, shopping using innovative technology (e.g., AR) may reflect personal characteristics and enhance social image. Thus, we may expect self-uniqueness to be a key factor in motivating customers to purchase products using AR technology. Previous literature has also reported that the need for uniqueness is a vital predictor of adopting innovative technology (Choi & Kim, 2016). Thus, we propose the following hypothesis:

H6. Self-uniqueness is positively related to purchase intention.

According to innovation diffusion theory (Rogers 1995), relative advantage represents the benefits resulted from the use of an innovative technology, such as savings in time and effort, and decrease in discomfort, and could be the critical predictor of an individual's behavioral intention (e.g., technology adoption) (Choudhury & Karahanna, 2008). This is in line with the standpoint of social exchange theory (Blau., 1964) that people will perform a behavior to pursue expected benefits. As such, we may recognize that when customers perceive that using AR technology could better assist them in assessing product fit and make more accurate purchase decisions than existing technologies (Jiang et al., 2021). Customers' intention to purchase products could be facilitated. Therefore,

H7. Relative advantage is positively related to purchase intention.

4. RESEARCH METHODOLOGY

4.1 Data collection

To test the proposed model, we used the online survey to examine the effect of product presentation on online impulse buying. Following Rauschnabel et al. (2022), we randomly recruited participants for the study through online social media. All participants were asked to use the research design developed by the Wanna Kicks app before answering the questionnaire. The Wanna Kicks app was chosen because it is a well-known software that allows users to virtually place products in a physical environment and has been employed by researchers to collect data for data analysis (e.g., Arghashi & Yuksel, 2022; Uhm et al., 2022). In addition, the AR application enables consumers to virtually try different brands of shoes (e.g., Adidas, Fila, Nike, etc.) and customize the brand, color, model, or size of the shoes. The AR app exhibits a high level of ego-involving functions, symbolically expressing a person's lifestyle or personality (Arghashi & Yuksel, 2022; Serravalle et al., 2023). Participants could choose the products (shoes) they wanted through the Wanna Kicks app on mobile devices. When they choose the product, the app asks users to turn on the device's camera to shoot a scene of their feet (shown in Figure 2). With AR technology, the app will dynamically combine the virtual shoes and the physical environment, demonstrating the image of putting the virtual shoes on participants' feet on the screen.

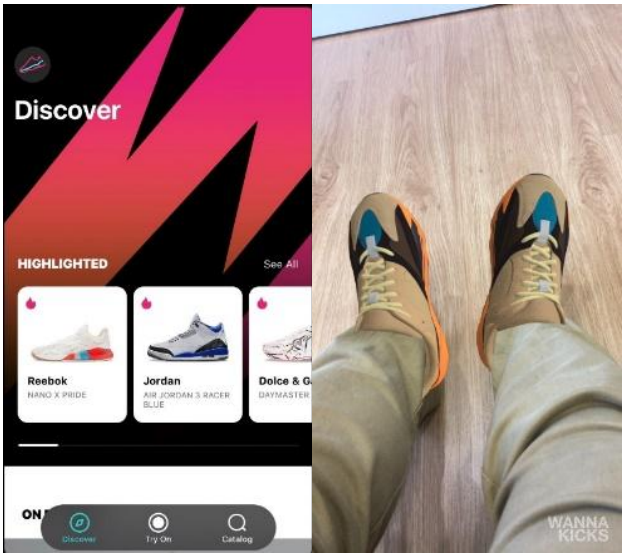

Figure 2. Demonstration of using the Wanna Kicks app with the mobile device

Hence, we considered this mobile application particularly suitable for our research, and after the trial, we requested participants to complete a survey questionnaire. The total number of valid questionnaires received was 264 (shown in Table 1).

Demographic information		Frequency	Percentage
Gender	Male	116	43.94
	Female	148	56.06
Age	< 20	2	0.76%
	21~30	50	18.94%
	31~40	95	35.98%
	41~50	78	29.55%
	51~60	35	13.26%
	Above 61 years	4	1.52%
Education	high school	21	7.95%
	College and University	178	67.42%
	Graduate level	65	24.62%

Table 1. Demographics of respondents (N = 264)

4.2 Measures

The questionnaire items for the constructs were adapted from previous research and have been assessed as adequately reliable and valid. (See Appendix A). The measurement items for augmented realism in this questionnaire were primarily revised from Hsu et al. (2021) and Steffen et al. (2019). The items for vividness were obtained from Ho et al. (2022) and Daassi & Debbabi (2021). The questionnaire items for interactivity were derived from Hsu et al. (2021) concerning interactivity features. The items for self-uniqueness were drawn from Hsu et al. (2021), Shiau & Huang (2023), and items specifically designed for this study. The measurement of Relative Advantages was concurrently adapted from Castillo S. & Bigne (2021) and Shiau & Huang (2023). The items related to purchase intention were modified from the questionnaire designed in Jiang et al. (2021).

All the items in the survey questionnaire were translated into Chinese and approved by two experts in the field. Before the main study, 32 participants were invited to complete a pre-test questionnaire to validate the validity and reliability of the

research scales. The questionnaire items were designed using a five-point Likert scale anchored by (1) "strongly disagree" to (5) "strongly agree." After the participants used the Wanna Kicks app, they were asked to evaluate the perceived affordance of AR, how AR satisfied their needs for relative advantages and self-uniqueness, and whether they tended to purchase products after using this app. The purpose of the pre-test was to assess the validity and reliability of the research scales. Based on the pre-test results, this study removed items that did not meet the reliability and validity criteria. Table 3 presents the scales used in the survey.

5. DATA ANALYSIS RESULTS

This study uses Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis with SmartPLS v. 4.0.8.3 (Ringle et al., 2022) to validate the model proposed by this research and follow the procedure proposed by Anderson & Gerbing (1988) and Hair et al. (2013). According to the criteria proposed by Hair et al. (2011) for the research method, this study adopts PLS-SEM for the following reasons: (1) This study aims to explore the determinants of augmented realism from the perspectives of NAF and UGT. Therefore, it possesses both an exploratory and theory-extending nature that meets the requirements of the PLS-SEM. (2) In this study, our model included mediation analysis involving six constructs, making the model structure relatively complex (Sarstedt et al., 2022). (3) Although the sample size of this study was relatively small (N=264), it exceeded the minimum sample size requirement (more than ten times the largest number of structural paths directed at a particular latent construct) (Hair et al., 2011). We conduct reliability and validity analyses in the following section and then estimate and verify the path coefficients and explanatory power of the structural model.

5.1 Test of measurement model

In this study, the measurement model was tested using reliability and validity tests. The convergent validity of the individual variables was measured by each item's standardized factor loading, composite reliability (CR), Cronbach's α, and average variance extracted (AVE) analysis. Hair et al. (2019) suggested that each item's standardized factor loading should be greater than 0.6 or 0.7. Table 2 shows that the individual item loadings for the final set of measurement items are above 0.8, which means suitable internal reliability. According to Hair et al. (2016), the values of composite reliability and Cronbach's α of each dimension greater than 0.7 indicate the good internal consistency. Table 2 also shows that CR and Cronbach's α of the constructs are above the recommended value of 0.7. Fornell and Larcker (1981) also suggested that an AVE higher than 0.5 has sufficient convergent validity. Our results reveal that the components AVE ranged from 0.73 to 0.87 (see Table 2). The results represent an acceptable level of the convergent validity of the measurement model components.

Construct	Indicator	Loading	Composite Reliability	Cronbach's Alpha	AVE
Augmented Reality (AR)	AR1	0.82	0.92	0.88	0.73
	AR2	0.88			
	AR3	0.82			
	AR4	0.90			
Vividness (VID)	VID1	0.93	0.95	0.92	0.87
	VID2	0.94			
	VID3	0.93			
Interactivity (ITA)	ITA1	0.86	0.90	0.84	0.76
	ITA2	0.90			
	ITA3	0.85			
Self-Uniqueness (SU)	SU1	0.81	0.91	0.85	0.77
	SU2	0.90			
	SU3	0.92			
Relative Advantages (RA)	RA1	0.84	0.88	0.80	0.72
	RA2	0.89			
	RA3	0.82			

	INT1	0.93			
Purchase Intention (INT)	INT2	0.92	0.95	0.92	0.86
	INT3	0.93			

Table 2. Convergent validity and internal consistency reliability

Note: All the t-values of the item loading are significant

To establish discriminant validity, Fornell and Larcker (1981) suggest that each construct's square root of AVE should be greater than its correlation with any other construct. Table 3 shows that each construct's square root of AVE (ranging from 0.847 to 0.931) is greater than its correlation with other constructs. Therefore, the constructs in this study have good discriminant validity. Moreover, Appendix B also shows that all the loading values of the items are more heavily on their corresponding construct than other constructs, confirming that discriminant validity is sufficient (Fornell & Larcker, 1981).

Construct	AR	VID	ITA	SU	RA	INT
AR	0.854					
VID	0.633	0.931				
ITA	0.707	0.651	0.869			
SU	0.614	0.717	0.716	0.877		
RA	0.512	0.661	0.693	0.745	0.847	
INT	0.579	0.611	0.654	0.737	0.753	0.925

Table 3. Discriminant validity testing

Notes: ITA = Interactivity, VID = Vividness, AR = Augmented Realism, SU = Self-uniqueness, RA = Relative Advantage, INT = Purchase Intention.

The diagonal value is the square root of the average variance extracted.

Since our data were collected using self-reported questionnaire, we used marker variable method to test the possible threat of common method bias (Lindell & Whitney, 2001). Following Carlson et al. (2021), we employed respondents' age was as the marker variable. The result shows that the marker variable is not related to the variables of the measurement models significantly, indicating that common method bias is not a critical issue for this study. In addition, our results show that VIFs ranged from 1.0 to 2.251, well below the common cut-off threshold of 3 (Hair et al., 2019), also indicating that our model can be considered free of common method bias.

5.2 Evaluation of structural model

As Figure 3 and Table 4 show, with the moderate explanatory power of augmented realism (R^2= 0.552), both interactivity and vividness strongly affect perceived augmented realism $\beta = 0.512, 0.299$; $p < 0.001$, $p < 0.001$, respectively), which means that interactivity and vividness are positively related to consumers' perception of augmented realism. Thus, H1 and H2 are supported.

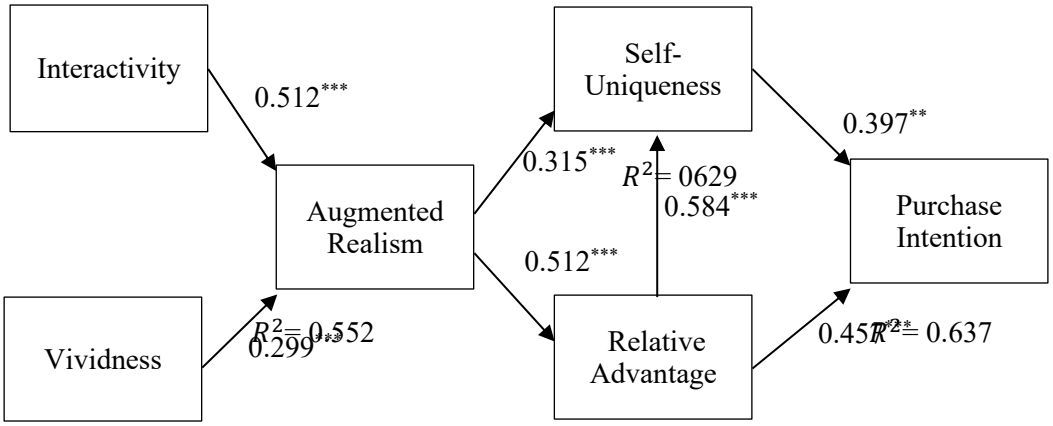

Figure 3. Results of the structural model.

Further analysis of the relationship between AR affordances and consumers' need for gratification shows that perceived augmented realism affects consumers' perceptions of relative advantage (β = 0.512, p < 0.001) and self-uniqueness (β = 0.315, p < 0.001), supporting H3 and H4. Significantly, the relative advantage strongly affects consumers' self-uniqueness (β = 0.584, p < 0.001), supporting H5.

	Coefficient	Standard Deviation	T Statistics	R^2	Hypothesis results
ITA→ AR	0.512	0.058	8.855***	0.552	H1: supported
VID→ AR	0.299	0.066	4.555***		H2: supported
AR → SU	0.315	0.060	5.257***	0.629	H3: supported
RA → SU	0.584	0.055	10.667***		H5: supported
AR → RA	0.512	0.053	9.701***	0.262	H4: supported
SU → INT	0.397	0.087	4.555**	0.637	H6: supported
RA → INT	0.457	0.086	5.318***		H7: supported

Table 4. Results of path analysis.

Notes: ITA = Interactivity, VID = Vividness, AR = Augmented Realism, SU = Self-uniqueness, RA = Relative Advantage, INT = Purchase Intention.

∗ p < .05; ∗∗ p < .01; ∗∗∗ p < .001.

With the moderate explanatory power of purchase intention (R^2= 0.637), both relative advantage (β = 0.457, p < 0.001) and self-uniqueness (β = 0.397, p < 0.01) affected consumers' intention to purchase. These results support H6 and H7 and show that consumers' need for gratification strongly affects their behavioral response.

5.3 Indirect and mediating effects

In our research model, we assume that consumers' needs for gratification are the underlying mechanism of the effect of perceived AR affordance on consumers' purchasing intentions. Therefore, we further tested indirect effects to examine the potentially important mechanisms whereby perceived augmented realism may influence consumers' intention to purchase. We have followed the Nitzl et al. (2016) recommended process. We conducted multiple mediation analyses to examine the role of needs gratifications (relative advantage and self-uniqueness) in mediating the effect of perceived augmented realism on purchasing intention. The bootstrapping procedure with 5,000 samples was used to construct and test (percentile and bias-corrected) confidence intervals for indirect effects. Table 5 summarizes the results of the indirect and mediating effects.

As Table 5 shows, in this model, relative advantage and self-uniqueness partially mediate the effects of perceived augmented realism on purchasing intention. When relative advantage and self-uniqueness are introduced into the model, the direct effect of perceived augmented realism on purchasing intention is less significant than its indirect effect on purchasing intention through both perceived relative advantage and self-uniqueness (CI= 0.035–0.158). Specifically, AR affordances indirectly

affect purchasing intention through the path from perceived augmentation realism to relative advantage, self-uniqueness, and purchase intention. Relative advantage partially mediates the relationship between perceived augmented realism and self-uniqueness (CI=0.221 to 0.397), and self-uniqueness also has a partial mediation effect on the relationship between relative advantage and intention to purchase (CI=0.072 to 0.296).

	Total effect on the behavioral response		Direct effect on the behavioral response		Indirect effects on the behavioral response			
	Coefficient	T statistics	Coefficient	T statistics		Coefficient	Bootstrap 95% CI	
							Percentile	Bias corrected
AR→INT	0.579	13.267***	0.164	2.878**	AR→INT	0.415	[0.055:0.279]	[0.061:0.285]
					AR→RA→INT	0.224	[0.135:0.335]	[0.134:0.332]
					AR→SU→INT	0.098	[0.035:0.172]	[0.042:0.182]
					AR→RA→SU→INT	0.093	[0.035:0.158]	[0.038:0.161]
AR→SU	0.613	14.025***	0.314	5.243***	AR→SU	0.299	[0.221:0.397]	[0.216:0.391]
					AR→RA→SU	0.299	[0.221:0.397]	[0.216:0.391]
A→INT	0.619	9.690***	0.437	5.069***	RA→INT	0.182	[0.072:0.296]	[0.074:0.298]
					RA→SU→INT	0.182	[0.072:0.296]	[0.074:0.298]

Table 5. Indirect and mediating effects.

Notes: ITA = Interactivity, VID = Vividness, AR = Augmented Realism, SU = Self-uniqueness, RA = Relative Advantage, INT = Purchase Intention.

* $p < .05$; ** $p < .01$; *** $p < .001$.

6. DISCUSSION AND CONCLUSIONS

6.1 Key findings

This study examines the influence of AR technology affordances on consumer purchase behavior integrating the perspectives of NAF and UGT. The findings provided full support for the conceptual model. First, we results show that augmented realism is primarily influenced by vividness and interactivity. The findings are in line with Vonkeman et al. (2017) and thus confirm the importance of vividness and interactivity in shaping product presence. Additionally, the significant effects of self-uniqueness and relative advantage confirm the standpoint of UGT that people tend to use technology to fulfill their needs. The findings also support that people will seek novelty to seek uniqueness (Roehrich, 2004; Gong et al., 2020) and AR technology could enhance one's benefit by evaluating products more accurately and making decision more certainly (McLean & Wilson, 2019; Oyman et al., 2022).

In addition, this study identifies that fulfilling one's self-uniqueness needs and relative advantage is the critical driver of customers' purchase decisions. The results confirm that people will carry on some specific actions to obtain expected benefits (Hsu et al., 2007). Finally, our study reveals that relative advantage is the predictor of self-uniqueness. This result supports that AR technology is innovative technology that can help improve product evaluation and choice quality (Kowalczuk et al., 2021). Thus, using AR technology may reflect one's personal characteristics (Choi & Kim, 2016; Morrison & Johnson, 2011) and thus enhance the perception of uniqueness. Finally, our results show that self-uniqueness and relative advantage as the strong mediators between the augmented realism and purchase intention. Our study thus demonstrates the critical roles of self-uniqueness and relative advantage in the purchase decision-making process.

6.2 Theoretical implications

This study makes significant theoretical contributions to existing literature. First, previous research on AR primarily focused on examining the effects of technological features on consumer cognition and affective response, which in turn affects their purchase behavior (e.g., Barta et al., 2023; Uhm et al., 2022; Yim et al., 2017). Yet, few studies have examined the role of psychological needs in the AR context. Based on NAF and UGT, this study reveals the self-uniqueness and perceived relative advantage indeed mediate the effect of AR affordances on customers' purchase intention. This extends the aspects of NAF and UGT to the AR context and thus advances our understanding about how AR affordances may impact customers' purchase intention.

Further, our study reports that cognitive factor (relative advantage) exerts a stronger effect on purchase intention than psychological needs (self-uniqueness). The findings extend past research by offering interesting insights as to the importance of fulfilling utilitarian and psychological needs in shaping one's purchase intention in AR setting. Second, our study shows that augmented realism is the antecedent of self-uniqueness and relative advantage. The findings extend existing literature by revealing that the capability of product presence not only facilitates one's understanding about product but also fulfils customers' uniqueness needs.

Finally, our study shows that interactivity and vividness are the predictors of augmented realism. Our results report that interactivity is the stronger antecedent of augmented realism than vividness. However, Vonkeman et al. (2017) found that vividness and interactivity exert similar effects on product presence. This finding contributes to the literature on AR by indicating that the importance of vividness may vary depends on the product types.

6.3 Managerial implication

This study also provides several useful implications for managers of retailing aiming to implement AR technology to their current marketing channels. Our findings highlight the crucial roles of interactivity and vividness in shaping augmented realism, which in turn may fulfill customers' relative advantage and uniqueness needs, and ultimately impacts their purchase intention. These results provide practical suggestions for the designers of AR applications. First, to increase interactivity, managers should provide friendly interface for AR systems to enhance customers' perception of ease of use and controllability to reduce consumers' technological anxiety. In addition, a more personalized AR system could be deployed to increase customer experience (Wang et al., 2022). To enhance human-content interaction experience, managers could also provide product and entertainment information for customer when they use AR systems to try products (Wang et al., 2022).

Second, to enhance vividness feature, managers may emphasize the aesthetic features of AR systems (Wang et al., 2022). The designer of AR systems, on the other hand, may verify whether the AR system can create an immersive shopping experience for customers using various devices, because some devices may not support the display of designed aesthetic features. On the one hand, to strengthen the perception of uniqueness, AR designers may deploy a mechanism allowing customers to input individual characteristics to create an atmosphere of exclusiveness. Past research found that architectural personalization is an effective strategy facilitating affective commitment (Kwon et al., 2020). Finally, past research argued that people with uniqueness needs generally attempt to seek distinctive products in the social group (Abosag, et al., 2020; Bloch, 1995), because they aim to avoid similarity with others (Abosag, et al., 2020; Snyder & Fromkin, 1977; Tian et al., 2001). Thus, managers could deploy a sharing mechanism allowing customers to share their product trial experience to their friends to achieve the uniqueness sought by consumers. By doing so, a brand could also promote its product and increase brand awareness as well.

6.4 Limitations

Although this study provides meaningful findings and insights, it has several limitations. First, the survey was conducted with consumers in Taiwan, and the results may not apply to other countries or regions because of differences in consumption culture and habits. Therefore, further research can test our model in other areas or countries to examine the generalization of this research. Second, this study introduced the UGT to integrate NAF to build a model that explains the relationship between AR technology and purchase behavior. While the study demonstrated that technology's relative advantage and its capabilities to satisfy consumers' needs for self-uniqueness strongly influence the intention to purchase products, there might be other needs worth further research as underlying mechanisms based on this study's model, such as curiosity, playfulness, and information sufficiency.

Third, the research tool used in this study was an AR app on mobile devices, and the application of AR technology was extensive, which may lead to different usage effects (Flavián et al., 2019). Moreover, although the results of this study showed that augmented realism significantly affected the relative advantage of AR technology, some factors may influence the evaluation of technology's relative advantage when consumers use AR apps (e.g., device type). Future research can incorporate this factor and analyze whether different technologies yield different effects. Finally, since this study focused on a relatively new AR shopping application technology, most users are still in the early adoption stage, and differences in their understanding of AR may exist compared with experienced users (Nikhashemi et al., 2021). Future research on this innovative technology could provide valuable insights.

REFERENCES

[1] Abosag, I., Ramadan, Z. B., Baker, T., & Jin, Z. (2020). Customers' need for uniqueness theory versus brand congruence theory: The impact on satisfaction with social network sites. *Journal of Business Research*, *117*, 862–872. https://doi.org/10.1016/j.jbusres.2019.03.016

[2] Alimamy, S., & Gnoth, J. (2022). I want it my way! The effect of perceptions of personalization through augmented reality and online shopping on customer intentions to co-create value. *Computers in Human Behavior*, *128*, 107105. https://doi.org/10.1016/j.chb.2021.107105

[3] Anderson, J. C., & Gerbing, D. W. (1988). Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, *103*(3). https://doi.org/10.1037/0033-2909.103.3.411

[4] Arghashi, V., & Yuksel, C. A. (2022). Interactivity, Inspiration, and Perceived Usefulness! How retailers' AR-apps improve consumer engagement through flow. *Journal of Retailing and Consumer Services*, *64*, 102756. https://doi.org/10.1016/j.jretconser.2021.102756

[5] Barta, S., Gurrea, R., & Flavián, C. (2023). Using augmented reality to reduce cognitive dissonance and

increase purchase intention. *Computers in Human Behavior*, *140*, 107564. https://doi.org/10.1016/j.chb.2022.107564.

[6] Belk, R. W. (1988). Possessions and the Extended Self. *Journal of Consumer Research*, *15*(2), 139–168. https://doi.org/10.1086/209154

[7] Blau, P.M., 1964. Exchange and Power in Social life. John Wiley and Sons, New York.

[8] Castillo S, M. J., & Bigne, E. (2021). A model of adoption of AR-based self-service technologies: a two country comparison. *International Journal of Retail & Distribution Management*, *49*(7), 875–898. https://doi.org/10.1108/IJRDM-09-2020-0380

[9] Carlson, J., Rahman, S.M., Rahman, M.M., Wyllie, J., Voola, R., 2021. Engaging Gen Y customers in online brand communities: A cross-national assessment. International Journal of Information Management, 56, 102252, https://doi.org/10.1016/j.ijinfomgt.2020.102252.

[10] Chan, W. Y., To, C. K. M., & Chu, W. C. (2015). Materialistic consumers who seek unique products: How does their need for status and their affective response facilitate the repurchase intention of luxury goods? *Journal of Retailing and Consumer Services*, *27*, 1–10. https://doi.org/10.1016/j.jretconser.2015.07.001.

[11] Chang, C.-M. (2018). Understanding social networking sites continuance. *Online Information Review*, *42*(6), 989–1006. https://doi.org/10.1108/OIR-03-2017-0088

[12] Chen, Y., & Lin, C. A. (2022). Consumer behavior in an augmented reality environment: Exploring the effects of flow via augmented realism and technology fluidity. *Telematics and Informatics*, *71*, 101833. https://doi.org/10.1016/j.tele.2022.101833

[13] Chiang, H.-S. (2013). Continuous usage of social networking sites. *Online Information Review*, *37*(6), 851–871. https://doi.org/10.1108/OIR-08-2012-0133

[14] Choi, J., & Kim, S. (2016). Is the smartwatch an IT product or a fashion product? A study on factors affecting the intention to use smartwatches. *Computers in Human Behavior*, *63*, 777–786. https://doi.org/10.1016/j.chb.2016.06.007

[15] Choudhury, V. & Karahanna, E. (2008). The relative advantage of electronic channels: A multidimensional view. MIS Quarterly, 32 (1), 179-200.

[16] Daassi, M., & Debbabi, S. (2021). Intention to reuse AR-based apps: The combined role of the sense of immersion, product presence and perceived realism. *Information & Management*, *58*(4), 103453. https://doi.org/10.1016/j.im.2021.103453

[17] Dacko, S. G. (2017). Enabling smart retail settings via mobile augmented reality shopping apps. *Technological Forecasting and Social Change*, *124*, 243–256. https://doi.org/10.1016/j.techfore.2016.09.032

[18] Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, *13*(3), 319. https://doi.org/10.2307/249008

[19] Fan, X., Chai, Z., Deng, N., & Dong, X. (2020). Adoption of augmented reality in online retailing and consumers' product attitude: A cognitive perspective. *Journal of Retailing and Consumer Services*, *53*, 101986. https://doi.org/10.1016/j.jretconser.2019.101986

[20] Fang, Y.-H. (2019). An app a day keeps a customer connected: Explicating loyalty to brands and branded applications through the lens of affordance and service-dominant logic. *Information & Management*, *56*(3), 377–391. https://doi.org/10.1016/j.im.2018.07.011

[21] Feiereisen, S., Wong, V., & Broderick, A. J. (2008). Analogies and Mental Simulations in Learning for Really New Products: The Role of Visual Attention. *Journal of Product Innovation Management*, *25*(6), 593–607. https://doi.org/10.1111/j.1540-5885.2008.00324.x

[22] Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2019). The impact of virtual, augmented and mixed reality technologies on the customer experience. *Journal of Business Research*, *100*, 547–560. https://doi.org/10.1016/j.jbusres.2018.10.050

[23] Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1). https://doi.org/10.1177/002224378101800104

[24] Gong, X., Zhang, K. Z. K., Chen, C., Cheung, C. M. K., & Lee, M. K. O. (2020). What drives trust transfer from web to mobile payment services? The dual effects of perceived entitativity. *Information and Management*, *57*(7). https://doi.org/10.1016/j.im.2019.103250

[25] Hair, J.F., Ringle, C.M., Sarstedt, M., 2011. PLS-SEM: Indeed a silver bullet. Journal of Marketing Theory and Practice, 19 (2), 139–151.

[26] Hair, J. F., Ringle, C. M., & Sarstedt, M. (2013). Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance. *Long Range Planning*, *46*(1–2), 1–12. https://doi.org/10.1016/j.lrp.2013.01.001

[27] Hair Jr, J. F., Hult, G. T. M., Ringle, C., &, & Sarstedt, M. (2016). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM). In *SAGE Publications.* (Issue Second).

[28] Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review, 31*(1), 2–24. https://doi. org/10.1108/EBR-11-2018-0203

[29] Hilken, T., de Ruyter, K., Chylinski, M., Mahr, D., & Keeling, D. I. (2017). Augmenting the eye of the beholder: exploring the strategic potential of augmented reality to enhance online service experiences. *Journal of the Academy of Marketing Science*, *45*(6), 884–905. https://doi.org/10.1007/s11747-017-0541-x

[30] Hinsch, C., Felix, R., & Rauschnabel, P. A. (2020). Nostalgia beats the wow-effect: Inspiration, awe and meaningful associations in augmented reality marketing. *Journal of Retailing and Consumer Services*, *53*, 101987. https://doi.org/10.1016/j.jretconser.2019.101987.

[31] Ho, X. H., Nguyen, D. P., Cheng, J. M. S., & Le, A. N. H. (2022). Customer engagement in the context of retail mobile apps: A contingency model integrating spatial presence experience and its drivers. *Journal of Retailing and Consumer Services*, *66*, 102950. https://doi.org/10.1016/j.jretconser.2022.102950

[32] Hsu, S. H.-Y., Tsou, H.-T., & Chen, J.-S. (2021). "Yes, we do. Why not use augmented reality?" customer responses to experiential presentations of AR-based applications. *Journal of Retailing and Consumer Services*, *62*, 102649. https://doi.org/10.1016/j.jretconser.2021.102649

[33] Huang, L., & Hsieh, Y. (2011). Predicting online game loyalty based on need gratification and experiential motives. *Internet Research*, *21*(5), 581–598. https://doi.org/10.1108/10662241111176380

[34] Hutchby, I. (2001). Technologies, Texts and Affordances. *Sociology*, *35*(2), 441–456. https://doi.org/10.1177/S0038038501000219

[35] IDC. (2022, November 30). *IDC Spending Guide Forecasts Strong Growth for Augmented and Virtual Reality*. International Data Corporation. https://www.idc.com/getdoc.jsp?containerId=prUS49916122

[36] Javornik, A. (2016). Augmented reality: Research agenda for studying the impact of its media characteristics on consumer behaviour. *Journal of Retailing and Consumer Services*, *30*, 252–261. https://doi.org/10.1016/j.jretconser.2016.02.004

[37] Jiang, Y., Wang, X., & Yuen, K. F. (2021). Augmented reality shopping application usage: The influence of attitude, value, and characteristics of innovation. *Journal of Retailing and Consumer Services*, *63*, 102720. https://doi.org/10.1016/j.jretconser.2021.102720

[38] Karagöz, D., & Uysal, M. (2022). Tourists' Need for Uniqueness as a Representation of Differentiated Identity. *Journal of Travel Research*, *61*(1), 76–92. https://doi.org/10.1177/0047287520972804

[39] Karahanna, E., Xin Xu, S., Xu, Y., & Zhang, N. (Andy). (2018). The Needs–Affordances–Features Perspective for the Use of Social Media. *MIS Quarterly*, *42*(3), 737–756. https://doi.org/10.25300/MISQ/2018/11492

[40] Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and Gratifications Research. *The Public Opinion Quarterly*, *37*(4), 509–523. http://www.jstor.org/stable/2747854

[41] Kauppinen-Räisänen, H., Björk, P., Lönnström, A., & Jauffret, M.-N. (2018). How consumers' need for uniqueness, self-monitoring, and social identity affect their choices when luxury brands visually shout versus whisper. *Journal of Business Research*, *84*, 72–81. https://doi.org/10.1016/j.jbusres.2017.11.012

[42] Keller, P. A., & Block, L. G. (1997). Vividness Effects: A Resource-Matching Perspective. *Journal of Consumer Research*, *24*(3), 295–304. https://doi.org/10.1086/209511

[43] Kim, J.-H., Kim, M., Park, M., & Yoo, J. (2023). Immersive interactive technologies and virtual shopping experiences: Differences in consumer perceptions between augmented reality (AR) and virtual reality (VR). *Telematics and Informatics*, *77*, 101936. https://doi.org/10.1016/j.tele.2022.101936

[44] Kirillova, K., & Chan, J. (2018). "What is beautiful we book": hotel visual appeal and expected service quality. *International Journal of Contemporary Hospitality Management*, *30*(3), 1788–1807. https://doi.org/10.1108/IJCHM-07-2017-0408

[45] Kowalczuk, P., Siepmann (née Scheiben), C., & Adler, J. (2021). Cognitive, affective, and behavioral consumer responses to augmented reality in e-commerce: A comparative study. *Journal of Business Research*, *124*, 357–373. https://doi.org/10.1016/j.jbusres.2020.10.050.

[46] Kunkel, N., Soechtig, S., Miniman, J., & Stauch, C. (2016). *Augmented and virtual reality go to work: Seeing business through a different lens*.

[47] Kwon, K. W., Bock, G. W., & Hwang, K. M. (2020). The effect of personalization on cross-buying and shopping cart abandonment based on the SOR framework. Asia pacific journal of information systems, 30(2), 252-283. https://doi.org/10.14329/apjis.2020.30.2.252

[48] Lee, K. M. (2004). Presence, Explicated. *Communication Theory*, 14 (1), 27–50.

[49] Lindell, M. K., Whitney, D. J. 2001. Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology, 86*(1), 114–121.

[50] McLean, G., & Wilson, A. (2019). Shopping in the digital world: Examining customer engagement through augmented reality mobile applications. *Computers in Human Behavior*, *101*, 210–224. https://doi.org/10.1016/j.chb.2019.07.002

[51] Mollen, A., & Wilson, H. (2010). Engagement, telepresence and interactivity in online consumer experience: Reconciling scholastic and managerial perspectives. *Journal of Business Research*, *63*(9–10), 919–925. https://doi.org/10.1016/j.jbusres.2009.05.014

[52] Morrison, K. R., & Johnson, C. S. (2011). When What You Have Is Who You Are: Self-Uncertainty Leads Individualists to See Themselves in Their Possessions. *Personality and Social Psychology Bulletin*, *37*(5), 639–651. https://doi.org/10.1177/0146167211403158

[53] Nam, J., Choi, H., & Jung, Y. (2024). What Drives Purchase Intention in Live-streaming Commerce in South Korea? Perspectives of IT Affordance and Streamer Characteristics. Asia Pacific Journal of Information Systems, 34(3), 810-836. https://doi.org/10.14329/apjis.2024.34.3.810

[54] Nitzl, C., Roldan, J. L., & Cepeda, G. (2016). Mediation analysis in partial least squares path modeling. *Industrial Management & Data Systems*, *116*(9), 1849–1864. https://doi.org/10.1108/IMDS-07-2015-0302

[55] Oyman, M., Bal, D., & Ozer, S. (2022). Extending the technology acceptance model to explain how perceived augmented reality affects consumers' perceptions. *Computers in Human Behavior*, *128*, 107127. https://doi.org/10.1016/j.chb.2021.107127

[56] Park, M., & Yoo, J. (2020). Effects of perceived interactivity of augmented reality on consumer responses: A mental imagery perspective. *Journal of Retailing and Consumer Services*, 52, 101912. https://doi.org/10.1016/j.jretconser.2019.101912

[57] Parker, C., Kay, J., Baldauf, M., & Tomitsch, M. (2016). Design implications for interacting with personalised public displays through mobile augmented reality. *Proceedings of the 5th ACM International Symposium on Pervasive Displays*, 52–58. https://doi.org/10.1145/2914920.2915016

[58] Qin, H., Osatuyi, B., & Xu, L. (2021). How mobile augmented reality applications affect continuous use and purchase intentions: A cognition-affect-conation perspective. *Journal of Retailing and Consumer Services*, *63*, 102680. https://doi.org/10.1016/j.jretconser.2021.102680

[59] Raja, V., & Calvo, P. (2017). Augmented reality: An ecological blend. *Cognitive Systems Research*, *42*, 58–72. https://doi.org/10.1016/j.cogsys.2016.11.009

[60] Rauschnabel, P. A. (2018). A Conceptual Uses & Gratification Framework on the Use of Augmented Reality Smart Glasses. In T. Jung & M. tom Dieck (Eds.), *Augmented Reality and Virtual Reality* (pp. 211–227). Springer. https://doi.org/10.1007/978-3-319-64027-3_15

[61] Rauschnabel, P. A., Felix, R., Hinsch, C., Shahab, H., & Alt, F. (2022). What is XR? Towards a Framework for Augmented and Virtual Reality. *Computers in Human Behavior*, *133*, 107289. https://doi.org/10.1016/j.chb.2022.107289

[62] Ray, A., Dhir, A., Bala, P. K., & Kaur, P. (2019). Why do people use food delivery apps (FDA)? A uses and gratification theory perspective. *Journal of Retailing and Consumer Services*, *51*, 221–230. https://doi.org/10.1016/j.jretconser.2019.05.025

[63] Ringle, C. M., Wende, S., & Becker, J.-M. (2022). *SmartPLS 4*. Http://Www.Smartpls.Com.

[64] Roehrich, G. (2004). Consumer innovativeness. *Journal of Business Research*, *57*(6), 671–677. https://doi.org/10.1016/S0148-2963(02)00311-9

[65] Rogers, E. M. (1995). Diffusion of Innovations (4th ed.), New York: The Free Press.

[66] Salo, M., Olsson, T., Makkonen, M., Hautamäki, A., & Frank, L. (2013). Consumer value of camera-based mobile interaction with the real world. *Pervasive and Mobile Computing*, *9*(2), 258–268. https://doi.org/10.1016/j.pmcj.2012.06.001

[67] Sarstedt, M., Ringle, C. M., & Hair, J. F. (2022). Partial Least Squares Structural Equation Modeling. In *Handbook of Market Research* (pp. 587–632). Springer International Publishing. https://doi.org/10.1007/978-3-319-57413-4_15

[68] Scholz, J., & Duffy, K. (2018). We ARe at home: How augmented reality reshapes mobile marketing and consumer-brand relationships. *Journal of Retailing and Consumer Services*, *44*, 11–23. https://doi.org/10.1016/j.jretconser.2018.05.004

[69] Serravalle, F., Vanheems, R., & Viassone, M. (2023). Does product involvement drive consumer flow state in the AR environment? A study on behavioural responses. *Journal of Retailing and Consumer Services*, *72*, 103279. https://doi.org/10.1016/j.jretconser.2023.103279

[70] Shaikh, S., Malik, A., Akram, M. S., & Chakrabarti, R. (2017). Do luxury brands successfully entice consumers? The role of bandwagon effect. *International Marketing Review*, *34*(4), 498–513. https://doi.org/10.1108/IMR-09-2014-0302

[71] Shao, W., Grace, D., & Ross, M. (2019). Consumer motivation and luxury consumption: Testing moderating effects. *Journal of Retailing and Consumer Services*, *46*, 33–44. https://doi.org/10.1016/j.jretconser.2018.10.003

[72] Shin, D. (2022). The actualization of meta affordances: Conceptualizing affordance actualization in the metaverse games. Computers in Human Behavior 133 (2022) 107292. https://doi.org/10.1016/j.chb.2022.107292

[73] Sheehan, D., & Dommer, S. L. (2020). Saving Your Self: How Identity Relevance Influences Product Usage. *Journal of Consumer Research*, *46*(6), 1076–1092. https://doi.org/10.1093/jcr/ucz037

[74] Shiau, W.-L., & Huang, L.-C. (2023). Scale development for analyzing the fit of real and virtual world integration: an example of Pokémon Go. *Information Technology & People*, *36*(2), 500–531. https://doi.org/10.1108/ITP-11-2020-0793

[75] Shiv, B., & Huber, J. (2000). The Impact of Anticipating Satisfaction on Consumer Choice. *Journal of Consumer Research*, *27*(2), 202–216. https://doi.org/10.1086/314320

[76] Smink, A. R., van Reijmersdal, E. A., & van Noort, G. (2022). Consumers' Use of Augmented Reality Apps: Prevalence, User Characteristics, and Gratifications. *Journal of Advertising*, *51*(1), 85–94. https://doi.org/10.1080/00913367.2021.1973622

[77] Snyder, C. R., & Fromkin, H. L. (1977). Abnormality as a positive characteristic: The development and validation of a scale measuring need for uniqueness. *Journal of Abnormal Psychology*, *86*(5), 518–527. https://doi.org/10.1037/0021-843X.86.5.518

[78] Steffen, J. H., Gaskin, J. E., Meservy, T. O., Jenkins, J. L., & Wolman, I. (2019). Framework of Affordances for Virtual Reality and Augmented Reality. *Journal of Management Information Systems*, *36*(3), 683–729. https://doi.org/10.1080/07421222.2019.1628877

[79] Su, Y.-S., Yu, L.-F., Wang, H.-C., Lu, S.-H., Ser, P.-S., Hsu, W.-T., Lai, W.-C., Xie, B., Huang, H.-M., Lee, T.-Y., & Chen, H.-W. (2019). Pose-Aware Placement of Objects with Semantic Labels - Brandname-based Affordance Prediction and Cooperative Dual-Arm Active Manipulation. *2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 4760–4767. https://doi.org/10.1109/IROS40897.2019.8967755

[80] Sun, C., Fang, Y., Kong, M., Chen, X., & Liu, Y. (2022). Influence of augmented reality product display on consumers' product attitudes: A product uncertainty reduction perspective. *Journal of Retailing and Consumer Services*, *64*, 102828. https://doi.org/10.1016/j.jretconser.2021.102828

[81] Tian, K. T., Bearden, W. O., & Hunter, G. L. (2001). Consumers' Need for Uniqueness: Scale Development and Validation. *Journal of Consumer Research*, *28*(1), 50–66. https://doi.org/10.1086/321947

[82] Uhm, J.-P., Kim, S., Do, C., & Lee, H.-W. (2022). How augmented reality (AR) experience affects purchase intention in sport E-commerce: Roles of perceived diagnosticity, psychological distance, and perceived risks. *Journal of Retailing and Consumer Services*, *67*, 103027. https://doi.org/10.1016/j.jretconser.2022.103027

[83] Vonkeman, C., Verhagen, T., & van Dolen, W. (2017). Role of local presence in online impulse buying. *Information & Management*, *54*(8), 1038–1048. https://doi.org/10.1016/j.im.2017.02.008

[84] Wagler, A., & Hanus, M. D. (2018). Comparing Virtual Reality Tourism to Real-Life Experience: Effects of Presence and Engagement on Attitude and Enjoyment. *Communication Research Reports*, *35*(5), 456–464. https://doi.org/10.1080/08824096.2018.1525350

[85] Wang, Y., Ko, E., & Wang, H. (2022). Augmented reality (AR) app use in the beauty product industry and consumer purchase intention. *Asia Pacific Journal of Marketing and Logistics*, *34*(1), 110–131. https://doi.org/10.1108/APJML-11-2019-0684

[86] Xu, J., Fedorowicz, J., & Williams, C. B. (2019). Effects of Symbol Sets and Needs Gratifications on Audience Engagement: Contextualizing Police Social Media Communication. *Journal of the Association for*

Information Systems, 536–569. https://doi.org/10.17705/1jais.00543

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

[88] Yim, M. Y.-C., & Park, S.-Y. (2019). "I am not satisfied with my body, so I like augmented reality (AR)." *Journal of Business Research*, *100*, 581–589. https://doi.org/10.1016/j.jbusres.2018.10.041

[89] Yoon, S., & Oh, J. (2022). A theory-based approach to the usability of augmented reality technology: A cost-benefit perspective. *Technology in Society*, *68*, 101860. https://doi.org/10.1016/j.techsoc.2022.101860

[90] Yu, W. J., Vu, Q. A., Oh, H., Nam, H. G., Zhou, H., Cha, S., Kim, J.-Y., Carvalho, A., Jeong, M., Choi, H., Castro Neto, A. H., Lee, Y. H., & Duan, X. (2016). Unusually efficient photocurrent extraction in monolayer van der Waals heterostructure by tunnelling through discretized barriers. *Nature Communications*, *7*(1), 13278. https://doi.org/10.1038/ncomms13278

fffff