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Research Article

Transforming Furniture E-Commerce: How Augmented Reality (AR) Shapes Consumer Purchase Intentions

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ABSTRACT

This study investigates the impact of augmented reality (AR) characteristics on purchase intention in the context of furniture e-commerce, employing the stimulus-organism-response (S-O-R) framework. Using a convenience sampling method, data were gathered from 202 respondents in Hong Kong. A quantitative approach utilizing partial least square-structural equation modeling (PLS-SEM) was applied to analyze the relationships among the constructs. The findings reveal that all AR characteristics—interactivity, informativeness, novelty, and aesthetics—significantly enhance hedonic value, while only interactivity and informativeness influence utilitarian value. Interestingly, novelty and aesthetics showed no significant effect on utilitarian value. Both hedonic and utilitarian values were found to have a positive impact on satisfaction and attitude, which, in turn, strongly influenced purchase intention. This study provides valuable theoretical and practical implications. For practitioners, the results underline the importance of leveraging AR features to enhance customer experience by focusing on interactivity and informativeness to drive both emotional engagement and functional utility. Additionally, recommendations are offered for furniture e-commerce businesses aiming to integrate AR into their platforms to improve customer satisfaction, foster positive attitudes, and ultimately boost purchase intention.

Keywords: Augmented reality, S-O-R Framework; hedonic value; utilitarian value; satisfaction; attitude; purchase intention.

INTRODUCTION

Augmented reality (AR) is an interactive technology that overlays 3D virtual objects onto the user's environment, enabling real-time interaction [1]. Fan et al. [2] demonstrated that AR transforms the way users receive information by allowing them to view products from multiple angles. Additionally, AR has been shown to enhance the consumer decision-making process during purchases [3, 4].

In recent years, AR has emerged as a significant technological trend in e-commerce. As highlighted in reference [5], investments in AR are projected to grow by 55.71% annually, with a compound annual growth rate (CAGR) of 31.5% from 2021 to 2026. Furthermore, academic interest in AR within the e-commerce domain has surged, with the number of related studies increasing from just five between 2010 and 2016 to 38 in 2021 [6]. Prior research has predominantly explored how AR generates hedonic and utilitarian value [7], influencing purchase intention [8], recommendation intention [9], and usage intention [10]. These findings highlight the importance of AR for both researchers and business practitioners.

AR has been widely implemented in e-commerce, particularly in the furniture sector. In 2022, furniture ranked among the top three product categories using AR, with 34% of US consumers using AR to view products [11]. Major furniture retailers such as IKEA, Macy's, and Pricerite have integrated AR into their mobile Apps to enhance the shopping experience. Traditionally, furniture e-commerce has faced challenges, as many consumers prefer visiting

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physical stores to evaluate product features and textures in person [6]. However, AR overcomes this limitation by allowing customers to visualize furniture products in their own spaces through superimposed overlays. This enables more accurate product reviews and reduces the time for making purchase decisions [12, 13]. AR is transforming the furniture shopping experience, providing customers with an efficient way to shift from imagining physical layouts to virtual representations of their spaces [14].

Although AR is widely implemented in furniture e-commerce, there is still limited research and a lack of a comprehensive theoretical model explaining how AR affects purchase intention specifically in this context [6]. Moreover, there is no agreement on the type of value consumers aim to gain when using AR (e.g. hedonic or utilitarian) or on the key AR characteristics of AR that drive these values [15]. This highlights a clear research gap that needs to be addressed. Based on this gap, the following research questions are proposed:

RQ1. To what extent do AR characteristics affect hedonic and utilitarian values?

RQ2. How do hedonic and utilitarian values influence consumer satisfaction and attitude, and subsequently their purchase intention?

RQ3. Which AR characteristics and consumer values (hedonic / utilitarian) should furniture e-commerce prioritize?

Answering these research questions provides a multifaceted understanding of how AR impacts purchase intention and the values consumers seek in furniture e-commerce. This understanding can serve as a guideline for AR developers and furniture retailers, particularly those hesitant to adopt AR technology. The structure of the research is as follows: A literature review and a theoretical model will be presented after the introduction. This will be followed by methodology and an empirical analysis with findings and discussion. Finally, the research will conclude with theoretical and practical contributions, as well as insights for future applications.

LITERATURE REVIEW

AR Furniture in E-Commerce

AR has emerged as a transformative tool in furniture e-commerce, enhancing the shopping experience by addressing traditional limitations. It allows consumers to interact with virtual models of furniture, offering accurate visual representations and enabling informed purchase decisions [12, 13]. By bridging the gap between physical and virtual environments, AR is revolutionizing the furniture shopping experience, offering consumers a more efficient way to visualize how products will fit and look in their actual spaces [14].

Theoretical Framework

The model is based on the Stimulus-Organism-Response (S-O-R) framework, which examines the impact of AR implementation on behavioral intention (see Figure 1). It was first introduced by Mehrabian and Russell [16], the S-O-R framework suggests that environmental stimuli (S) triggers cognitive and affective responses (O) and further affect the behavior (R). The theoretical model defines S as including five AR characteristics: interactivity, novelty, aesthetics, technicality, and informativeness. O represents hedonic and utilitarian values, which influence satisfaction and attitude. Finally, R relates to purchase intention [7]-[8].

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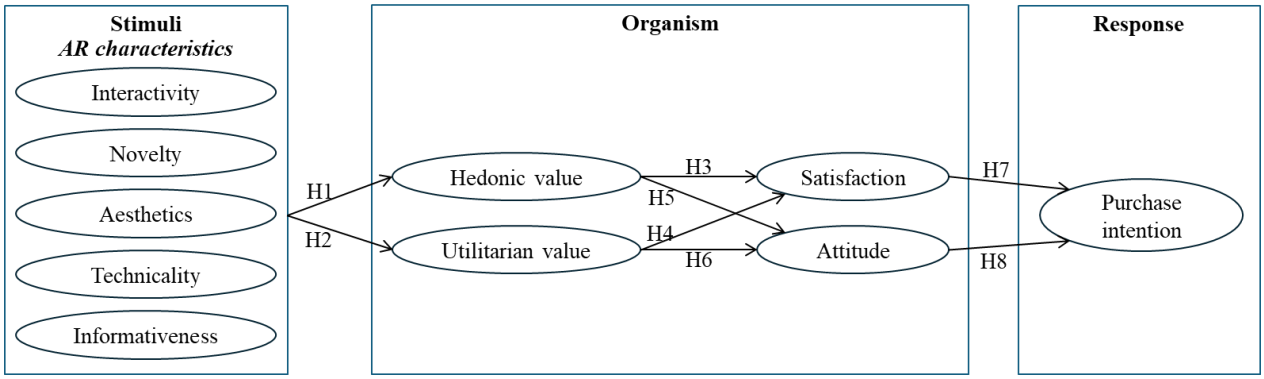

Adapted from [7]-[8]-[9]

Figure 1. Conceptual Model

Stimuli – Five AR Characteristics

Interactivity

Interactivity is a critical feature of AR technology, as demonstrated in prior studies [15]. It refers to the real-time interaction between users and virtual objects within the mediated environment [18, 19]. This includes the extent to which AR features allow users to control and manipulate products and the interface [10]. The degree of interactivity varies depending on the quality of virtual objects, which impacts user engagement [20]. For instance, 3D virtual objects provide a stronger sense of engagement compared to 2D objects [21].

Novelty

Novelty refers to the new, unique, and personalized experiences that customers encounter through AR [22]. Novelty is also defined as something perceived to be new, special, or different [23], it offers users an innovative way to engage with AR content, such as text, 3D virtual objects, and images [24, 25]. In the furniture e-commerce context, AR apps enable users to place virtual furniture in their physical environments in real-time, creating highly personalized and unique experiences [26]. These features allow users to tailor content to their preferences and interests, enhancing their overall experience [22].

Aesthetics

Aesthetics includes the visual appeal and entertainment value of AR experiences, which are influenced by factors such as design, color, and the vividness of virtual objects [27]. Fundamentally, aesthetics refers to the "beauty" presented through the interface [28]. A visually attractive and well-designed AR interface not only enhances user engagement but also encourages continued use of the technology [29]. In the context of AR furniture e-commerce, an aesthetically pleasing interface combined with realistic virtual objects can significantly enhance the user experience, motivating customers to engage with the platform more frequently.

Technicality

Technicality refers to the technical efficiency, reliability, and usability of AR apps and websites [30]. It also includes key aspects such as user-friendliness and ease of navigation [9]. Technical issues, such as slow loading times or glitches, can disgust users experience, preventing users from fully leveraging AR features and potentially causing frustration, anxiety, and mental exhaustion [31, 32]. Thus, ensuring technical reliability is essential for delivering a smooth, seamless, and satisfying user experience.

Informativeness

Informativeness refers to the ability of AR to deliver relevant and useful product information that enhances customer understanding and satisfaction during the decision-making process [33, 12]. Unlike traditional online shopping,

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which limits sensory interaction with products, AR bridges this gap by offering detailed visualizations and rich product insights [12].

Organisms – Values

Hedonic Value

Hedonic value relates to the pleasure and enjoyment users derive from interacting with AR technology [10]. It emphasizes fun and playfulness over task completion [10, 34, 58]. In AR furniture e-commerce, hedonic value is generated through interactive and visually appealing elements, creating entertaining and enjoyable experiences for users [2, 33].

Utilitarian Value

Utilitarian value reflects the perceived usefulness of a product, service, or app [10, 58]. AR enhances utilitarian value by providing detailed product information and enabling consumers to evaluate products more effectively [35, 36]. This value is associated with practical and functional benefits, leading to a sense of accomplishment [3]. In this study, utilitarian value refers to the perceived usefulness of AR in providing accurate information for purchase decisions [34].

Impact of AR characteristics on hedonic and utilitarian Values

Previous studies have demonstrated that ***interactivity*** delivers both utilitarian and hedonic values to customers [9, 10, 15]. A high level of interactivity enables customers to gain these values by minimizing information asymmetry, facilitating engaging real-time interactions, and offering access to reliable information [37]. Based on this, the following hypothesis is proposed:

H1a: Interactivity positively influences hedonic value.

H2a: Interactivity positively influences utilitarian value.

Novelty has been shown to be strongly associated with hedonic value [38, 22]. AR apps and websites featuring novel characteristics can enhance customer enjoyment by offering unique and engaging experiences [39, 22]. Humans are naturally drawn to novel stimuli from birth [40], as such stimuli capture attention, form curiosity, and foster immersion, ultimately leading to enhanced enjoyment and hedonic value [41, 40].

Furthermore, novelty in AR can improve the functional (utilitarian) experience by increasing shopping efficiency [39, 22]. For instance, AR features enable users to visualize furniture placement in real-time, view actual product dimensions, and access additional product details and reviews, helping customers make better decisions and enhancing their overall shopping performance [22]. Therefore, the hypotheses are shown below:

H1b: Novelty positively influences hedonic value.

H2b: Novelty positively influences utilitarian value.

Aesthetics impact hedonic value by offering visually appealing designs and vivid virtual objects [9]. While it has been established that aesthetics enhances hedonic value, they were not initially found to affect utilitarian value. However, other studies suggest that aesthetics can indeed influence utilitarian value, as a well-designed AR website or app can provide clear and accurate content, enhancing the utilitarian value perceived by customers [28]. Based on this, we formulated the following hypotheses:

H1c: Aesthetics positively influences hedonic value.

H2c: Aesthetics positively influences utilitarian value.

Previous research has demonstrated that ***technicality*** can impact hedonic value [42, 43]. Additionally, technicality has been shown to positively influence both hedonic and utilitarian values in the context of AR apps [9]. Frequent

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technical issues, such as long loading times, may diminish customers' enjoyment (hedonic value) and perceived usefulness (utilitarian value) of the AR apps. Therefore:

H1d: Technicality positively influences hedonic value.

H2d: Technicality positively influences utilitarian value.

Informativeness has been shown to have positive impact hedonic value but not utilitarian value in the context of beauty makeup apps, which prioritize hedonism over utility [10]. However, in the context of AR furniture e-commerce, providing relevant and useful information is crucial for evaluating furniture and achieving greater satisfaction during the product selection process [6, 44]. Previous research has confirmed that AR apps can deliver utilitarian value through the information they provide [45], and informativeness has been found to enhance utilitarian value [33]. Hence:

H1e: Informativeness positively influences hedonic value.

H2e: Informativeness positively influences utilitarian value.

Satisfaction

Satisfaction is defined as the contentment and enjoyment resulting from the alignment between customer expectations and the performance of a product, service, or app [46, 47]. Previous research has shown that hedonic value plays a significant role in influencing user satisfaction, particularly in the contexts of AR virtual try-on experiences [8] and AR online shopping [7]. This suggests that if AR furniture e-commerce platforms can deliver enjoyment and fun, customers are likely to feel satisfied. Additionally, utilitarian value has been shown to positively impact satisfaction in AR online shopping contexts [7]. Utilitarian value is defined as how consumers perceive the practical and functional aspects of a product, such as its size, color, dimensions, or how it might appear when placed in a real-world setting [25]. AR enables consumers to interact with and control virtual products, enabling them to form a mental image of how the product's functional aspects align with their reality [7]. Therefore, if AR furniture e-commerce platforms provide functional benefits that integrate with consumers' real-world needs, customer satisfaction will be enhanced.

H3: Hedonic value positively influences satisfaction.

H4: Utilitarian value positively influences satisfaction.

Attitude

Attitude refers to an individual's evaluation, reactions, and positive feelings while using an AR furniture website [57]. Hedonic value has been shown to enhance customer attitudes [7, 34, 48]. When customers perceive a behavior as highly valuable (e.g., AR online shopping), they are more likely to develop a favorable attitude toward that behavior [34]. Furthermore, research has indicated that utilitarian value also positively influences attitude [34, 7]. When customers derive value from useful and relevant product information, they are more inclined to form positive attitudes toward the AR furniture website. Based on this, two hypotheses are proposed:

H5: Hedonic value positively influences attitude towards the AR furniture website.

H6: Utilitarian value positively influences attitude towards the AR furniture website.

Response – Purchase Intention

Purchase intention is defined as a customer's willingness to purchase a product [8]. AR features can enhance purchase intention by providing detailed product information and delivering a positive user experience [49]. When customers are satisfied and develop a favorable attitude, they are more likely to proceed with a purchase [7]. Satisfaction has been shown to positively influence behavioral intentions, including purchase intention. For instance, reference [8] identifies that satisfaction can drive continuance intention in the context of AR makeup apps and impulse buying in AR tourism apps. Applying this to our study:

H7: Satisfaction positively influences purchase intention.

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Furthermore, references [50] and [51] showed that attitude is important in determining behavioral intentions, such as purchase intention. Previous studies [7, 48] have established that attitude significantly influences behavioral intention. Additionally, a positive attitude can increase usage and boost repurchase intentions in the context of mobile applications [52]. Extending these findings to our study:

H8: Attitude towards the AR furniture website positively influences purchase intention.

METHODOLOGY

Research design

An online survey was conducted using a Google Form questionnaire. Participants were introduced to the IKEA AR website, *IKEA Kreativ*, and the survey employed a convenience sampling approach. This non-probability sampling method involves selecting participants based on their ease of accessibility, availability, and willingness to participate in the study [53].

The survey was conducted in person to ensure that respondents had used the IKEA Kreativ platform. At the start of the survey, respondents were provided with an introduction to help them understand what AR is. They were then instructed to complete the first section of the questionnaire, which focused on usage behavior related to the context of this study. Following this, participants were asked to browse the IKEA Kreativ website and decorate the AR showroom for a minimum of five minutes using the researcher's computer. The researcher recorded each participant's browsing time to ensure they spent at least five minutes on the website. After completing this activity, participants proceeded to answer the remaining sections of the questionnaire. Survey responses from participants who browsed the website for less than five minutes were excluded from the study.

Table 1: Measurement items

	Constructs/ Measurement Items	Loadings	Adapted from
	Manipulation questions		
MC1	In the IKEA AR website, I actively interact with the virtual furniture/product.		---
MC2	In the IKEA AR website, I feel fully immersed in the "Showroom".		
MC3	The IKEA AR website is easy to use.		
MC4	The IKEA AR website is easy to navigate.		
MC5	In the IKEA AR website, I am able to view the IKEA furniture/product information successfully.		
	Interactivity		
IN1	The IKEA AR website allows me to interact with it to receive tailored information about furniture/products.	0.900	Hsu-et-al., 2021
IN2	The IKEA AR website has interaction features that help me make decisions when selecting.	0.900	
IN3	I am able to interact with the IKEA AR website to obtain information tailored to my specific needs.	0.895	
	Novelty		
NV1	Using the AR feature offers something new each time.	0.868	Mclean & Wilson, 2019
NV2	Using the AR feature offers unique information.	0.691	
NV3	Using the AR feature is something different each time.	0.832	

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	Constructs/ Measurement Items	Loadings	Adapted from
	Aesthetics		
AS1	The interface of this IKEA AR website is aesthetically appealing.	0.845	Qin et al., 2024
AS2	The interface of this IKEA AR website is attractive.	0.902	
AS3	The interface of this MAR app is aesthetically designed	0.908	
AS4	The interface of this IKEA AR website is aesthetically designed.	0.879	
	Technicality		
TH1	The IKEA AR website is not difficult to use.	0.888	Qin et al., 2024
TH2	Learning to operate this IKEA AR website is not difficult for me.	0.918	
TH3	Interacting with this IKEA AR website requires little mental effort.	0.906	
TH4	It is not difficult for me to become skillful at using the IKEA AR website.	0.876	
TH2		**0.918**	
	Informativeness		
INFF1	The IKEA AR website shows the information I expected.	0.840	Kowalczuk et al., 2021
INFF2	The IKEA AR website provides detailed information about the furniture/products.	0.899	
INFF3	The IKEA AR website provides complete information about the furniture/products.	0.902	
INFF4	The IKEA AR website provides information that helps me in my decision.	0.897	
INFF5	The IKEA AR website provides information to compare furniture/products.	0.810	
	Hedonic Value		
HV1	Using the IKEA AR website I have fun.	0.844	Hsu-et-al., 2021
HV2	Using the IKEA AR website gives me enjoyment.	0.858	
HV3	Using the IKEA AR website makes me feel excited.	0.758	
HV4	Using the IKEA AR website delights me.	0.888	
	Utilitarian Value		
UV1	Using the IKEA AR website is effective for me.	0.929	Hsu-et-al., 2021
UV2	Using the IKEA AR website is helpful for me.	0.948	
UV3	Using the IKEA AR website is practical for me.	0.930	
	Satisfaction		
ST1	I feel satisfied because my need to try furniture/products is fulfilled by using the IKEA AR website.	0.845	Gabriel et al., 2023
ST2	I am satisfied with the suitability of furniture/products visualization when using the IKEA AR website.	0.794	
ST3	The experience of using the AR feature is in line with my expectations.	0.864	
ST4	Overall, I feel satisfied in using the IKEA AR website to try furniture/product.	0.874	

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	Constructs/ Measurement Items	Loadings	Adapted from
	Attitude		
AT1	I am positive about the IKEA AR website.	0.895	Rese et al., 2017
AT2	The IKEA AR website is so interesting that I just want to learn more about it.	0.844	
AT3	The use of the IKEA AR website is a good idea.	0.767	
AT4	Other people should also use the IKEA AR website.	0.714	
	Purchase Intention		
PT1	I will buy furniture/products that I have previously tried through the IKEA AR website soon.	0.838	Gabriel et al., 2023
PT2	I want to buy a furniture/product that I have previously tried through the IKEA AR website soon.	0.900	
PT3	I hope to buy furniture/products that I have previously tried through the IKEA AR website soon.	0.878	
PT4	I will recommend the product that I tried through the IKEA AR website.	0.763	

Measurement items

The questionnaire consisted of three sections. The first section focused on gathering data about usage behavior relevant to the research context. The second section included measurement items for the constructs in the theoretical model, utilizing a seven-point Likert scale to evaluate participants' level of agreement with the AR experience. The third section collected demographic information, including gender, age, and education level.

The measurement items for each construct were adapted from prior studies (Table 1): interactivity [10]; novelty [22]; aesthetics and technicality [9]; informativeness [12]; hedonic value and utilitarian value; [10]; satisfaction [8]; attitude [33]; and purchase intention [8]

Data Analysis and Procedure

Partial least square-structural equation modelling (PLS-SEM) with Smart-PLS 4 was used to analyze all the measurement and structural models. A total of 202 respondents completed the survey. All participants were included in the sample, as they had used the AR Kreativ platform for at least five minutes. Tables 2 and 3 present the demographic information and usage behavior of the sample. The sample consisted of 55.0% males and 45.0% females, with the majority (90.6%) falling within the age range of 21 to 40 years. Only 4% of respondents were over the age of 41. In terms of usage behavior, 92.1% of respondents had prior experience with AR. However, 85.6% indicated that their average weekly frequency of AR use was zero. Additionally, 47% of respondents had previously purchased furniture online, while 53% had not.

Table 2: Respondent profile

Attributes	Category	N	%
Gender	Male	111	55
	Female	91	45
Age	Below 10	0	0
	10-20 years old	10	5
	21-30 years old	115	56.9
	31-40 years old	68	33.7
	41-50 years old	7	3.5
	51-60 years old	2	1

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Attributes	Category	N	%
	61-70 years old	0	0
	Above 70 years old	0	0
Education Level	Secondary school	19	9.4
	Foundation diploma/diploma/AD/HD	30	14.9
	Bachelor's degree	146	72.3
	Master's degree	5	2.5
	Doctorate degree	2	1
Program of Study (Currently/ Graduated from)	Business administration or management	33	16.3
	Marketing	40	19.8
	Interior design or architecture	22	10.9
	Information technology or computer science	19	9.4
	Psychology or consumer behavior	6	3
	Engineering	31	15.3
	Others	51	25.2
Occupation	Self-employed	9	4.5
	Professional	31	15.3
	Education	13	6.4
	Clerk	73	36.1
	Student	56	27.7
	Housewife	3	1.5
	Others	17	8.4
Job Status	Having a part-time job	8	4
	Full time studying without any job	56	27.7
	Having a full-time job	135	66.8
	Unemployed	3	1.5
	Job-seeker	0	0
Monthly income (Your own income)	Below HK$10,000	57	28.2
	HK$10,000-$19,999	16	7.9
	HK$20,000-$29,999	68	33.7
	HK$30,000-$39,999	32	15.8
	HK$40,000-$49,999	21	10.4
	HK$50,000 or above	8	4
Estimated monthly family income	Below HK$10,000	5	2.5
	HK$10,000-$29,999	10	5
	HK$30,000-$59,999	69	34.2
	HK$60,000-$99,999	87	43.1
	HK$100,000-$149,999	25	12.4
	HK$150,000 or above	6	3
Total		**202**	**100.0**

Source(s): Authors' work

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Table 3: Usage behavior

Attributes	Categories	N	%
Previous AR experience	Yes	186	92.1
	No	16	7.9
Frequency of experiencing AR in a week	0	173	85.6
	1	16	7.9
	2	8	4
	3	2	1
	4	0	0
	5	2	1
	6	0	0
	7	1	0.5
Experience of buying furniture online	Yes	95	47
	No	107	53
Recent experience of purchasing furniture	Within the past week	4	2
	Within the past month	14	6.9
	1-3 months ago	20	9.9
	3-6 months ago	59	29.2
	More than 6 months ago	42	20.8
	I haven't purchased furniture recently.	63	31.2
Total		**202**	**100.0**

Source(s): Authors' work

Table 4: Reliability and convergent validity

Key variables	Items	Mean	SD	CR	AVE
Interactivity	3	5.416	1.089	0.926	0.806
Novelty	3	4.525	1.027	0.827	0.618
Aesthetics	4	5.936	0.882	0.935	0.781
Technicality	4	6.149	0.903	0.943	0.805
Informativeness	5	4.975	1.214	0.940	0.758
Hedonic value	4	5.640	0.824	0.904	0.703
Utilitarian value	3	5.252	1.246	0.955	0.875
Satisfaction	4	5.494	0.861	0.909	0.714
Attitude	4	5.498	0.764	0.875	0.637
Purchase intention	4	5.051	0.999	0.909	0.716

Source(s): Authors' work

Measurement model

This study utilized a cross-sectional survey design. To address concerns related to common method bias, we conducted Harman's one-factor test, a post-hoc statistical technique. This test assesses whether a single data source and a uniform scaling approach introduce systematic variation in responses (Fuller et al., 2016). An exploratory factor analysis (EFA) was performed in SPSS, including all study variables. The results showed that the first factor

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accounted for 33.4% of the total variance, which is well below the 50% threshold, indicating that common method bias was not a significant concern in this study.

The reliability and validity of the model were evaluated using three criteria: (1) convergent validity (average variance extracted [AVE] of each construct), (2) composite reliability, and (3) discriminant validity (heterotrait-monotrait [HTMT] ratio). Hair Jr et al. (2017) suggested that the outer loadings of all measurement items are required to be greater than 0.70 in order for the measurement items to be considered reliable, in our results, all loadings were greater than 0.691 (Table 1). The composite reliability is required to be above 0.70 (Table 4). Each construct's AVE was greater than the suggested threshold of 0.50 [55], demonstrating that the model is convergent (Table 4). Last, HTMT ratios (Table 5) that were less than the proposed cutoff threshold of 0.90 [56] revealed discriminant validity of the model.

Table 5: Discriminant validity (Heterotrait-monotrait method)

	IN	NV	AS	TH	INFF	HV	UV	ST	AT	PT
Interactivity (IN)	–									
Novelty (NV)	0.322	–								
Aesthetics (AS)	0.455	0.302	–							
Technicality (TH)	0.378	0.244	0.707	–						
Informativeness (INFF)	0.322	0.235	0.253	0.235	–					
Hedonic value (HB)	0.499	0.572	0.627	0.572	0.424	–				
Utilitarian value (UV)	0.466	0.113	0.255	0.341	0.544	0.442	–			
Satisfaction (ST)	0.554	0.383	0.513	0.472	0.445	0.663	0.575	–		
Attitude (AT)	0.472	0.374	0.475	0.374	0.500	0.611	0.518	0.746	–	
Purchase intention (PT)	0.309	0.214	0.257	0.214	0.417	0.447	0.534	0.665	0.660	–

Source(s): Authors' work

Table 6: Summary of PLS-SEM path analysis

Relationship	**H**	**Path Coefficients**	**T statistics**	**P values**	**Conclusion**
Interactivity → Hedonic value	H1a	0.151	2.483	0.013**	Supported
Interactivity → Utilitarian value	H2a	0.293	3.291	0.001***	Supported
Novelty → Hedonic value	H1b	0.174	3.344	0.001***	Supported
Novelty → Utilitarian value	H2b	-0.116	1.670	0.095	Rejected
Aesthetics → Hedonic value	H1c	0.288	3.572	0.000***	Supported
Aesthetics → Utilitarian value	H2c	-0.084	0.965	0.335	Rejected
Technicality → Hedonic value	H1d	0.195	2.199	0.028**	Supported
Technicality → Utilitarian value	H2d	0.201	2.559	0.011**	Supported
Informativeness → Hedonic value	H1e	0.172	3.270	0.001***	Supported
Informativeness → Utilitarian value	H2e	0.423	5.229	0.000***	Supported

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Relationship	H	Path Coefficients	T statistics	P values	Conclusion
Hedonic value → Satisfaction	H3	0.438	6.060	0.000***	Supported
Utilitarian value → Satisfaction	H4	0.345	4.557	0.000***	Supported
Hedonic value → Attitude	H5	0.406	5.626	0.000***	Supported
Utilitarian value → Attitude	H6	0.301	5.174	0.000***	Supported
Satisfaction → Purchase intention	H7	0.367	4.354	0.000***	Supported
Attitude → Purchase intention	H8	0.330	4.204	0.000***	Supported

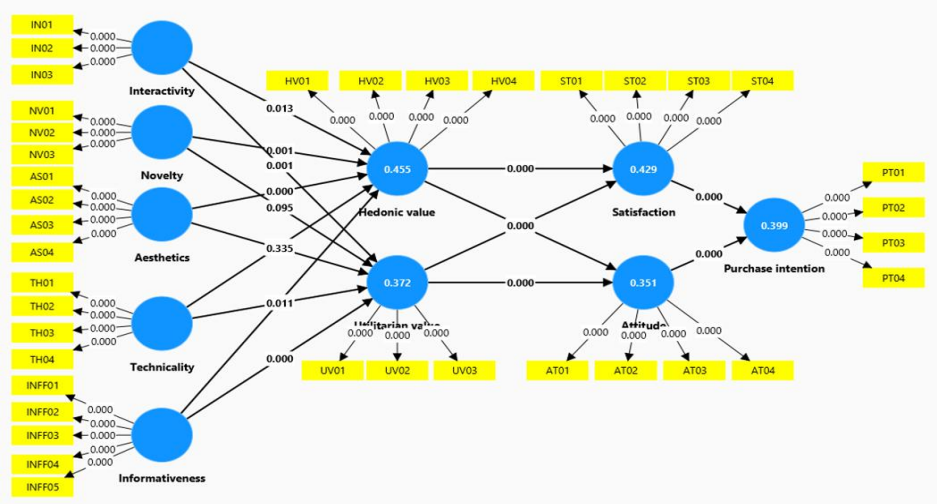
Source(s): Authors' work

Notes: *p < .05; **p < .01; ***p < .001

Structural model

The hypotheses were evaluated using path coefficients (β) derived from PLS-SEM path analysis, with the results presented in Table 7 and Figure 2. Bootstrapping with 5,000 re-samples [55] was employed to assess the statistical significance of the hypothesized model. A t-value greater than 1.96 was considered statistically significant (i.e., t = 1.96, p ≤ .05). The model accounted for 45.5% of the variance in hedonic value, 37.2% in utilitarian value, 42.9% in satisfaction, and 39.9% in purchase intention (Table 6). The findings indicated that interactivity had a significant positive effect on hedonic value (β = 0.151, p < .05) and utilitarian value (β = 0.293, p < .001), supporting H1a and H2a, respectively. Novelty significantly influenced hedonic value (β = 0.174, p < .001) but did not significantly affect utilitarian value (β = -0.116, p = .095), supporting H1b but rejecting H2b. Aesthetics had a significant positive impact on hedonic value (β = 0.288, p < .001) but not on utilitarian value (β = -0.084, p = .335), supporting H1c but rejecting H2c. Technicality positively affected both hedonic value (β = 0.195, p < .05) and utilitarian value (β = 0.201, p < .01), supporting H1d and H2d. Similarly, informativeness significantly influenced both hedonic value (β = 0.172, p < .001) and utilitarian value (β = 0.423, p < .001), supporting H1e and H2e.

Additionally, both hedonic value and utilitarian value significantly impacted satisfaction (H3: β = 0.438, p < .001; H4: β = 0.345, p < .001) and attitude (H5: β = 0.406, p < .001; H6: β = 0.301, p < .001). Finally, satisfaction (H7: β = 0.367, p < .001) and attitude (H8: β = 0.330, p < .001) both significantly influenced purchase intention.



Source(s): Authors' work

Notes: *p < .05; **p < .01; ***p < .001

Figure 2. Structural Model

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Table 7: R-square & adjusted R-square

	R-square	R-square adjusted
Hedonic value	0.455	0.441
Utilitarian value	0.372	0.356
Satisfaction	0.429	0.423
Attitude	0.351	0.345
Purchase intention	0.399	0.393

Source(s): Authors' work

DISSCUSSION

Consistent with reference [9] and reference [10], interactivity has a positive impact on both hedonic and utilitarian values. This suggests that customers derive enjoyment when interacting with high-quality virtual objects. Customers engaging with 3D virtual objects report higher levels of hedonic value compared to interactions with 2D objects [12]. IKEA Kreativ enhances this by allowing customers to virtually place 1:1 scale virtual furniture in the showroom. Rather than relying solely on product photos and descriptions, customers can visualize the furniture's scale and appearance, reducing the threat of information asymmetry [37] and enhancing utilitarian value.

Novelty also shows a positive impact on hedonic value, consistent with reference [38] and reference [8]. The sense of uniqueness experienced by users enhances their enjoyment of AR experiences [34]. For example, the IKEA Kreativ website enables users to "play" with the virtual showroom by freely placing different pieces of furniture during their interaction, which contributes to the enjoyment reported by users. However, novelty does not significantly impact utilitarian value, which contradicts the findings of reference [38]. One possible explanation is that IKEA Kreativ may not sufficiently innovate to meet the practical needs of users. In the context of utilitarian value, users may prioritize practical aspects such as determining whether the furniture fits their needs and space constraints. As a result, novelty may not significantly enhance their utilitarian evaluation

Aesthetics positively impact hedonic value, consistent with reference [9], but do not significantly affect utilitarian value, which contrasts with the findings of reference [28]. This discrepancy may be attributed to the distinct nature of these constructs. Utilitarian value emphasizes functional and practical benefits, which are objective and rational in nature [9]. In contrast, aesthetics focuses on the visual and emotional appeal of an AR experience, which is subjective and tied to sensory responses. Consequently, participants in this study may have been less likely to associate aesthetics with utilitarian value.

Consistent with [9], this study confirms that technicality positively influences both hedonic and utilitarian values. As indicated in reference [32], a high level of technical sophistication enhances user experiences with AR systems. Conversely, low technicality may create frustration as users expend more mental effort. A well-designed AR system, such as the IKEA Kreativ platform, enables users to complete tasks with minimal effort, thereby increasing enjoyment and perceived practicality [9].

Informativeness positively impacts hedonic value, consistent with reference [10]. This suggests that when product information is presented in an engaging manner, it enhances users' perceived enjoyment [54]. Although informativeness also positively impacts utilitarian value, this finding is inconsistent with reference [21]. The possible reason of the discrepancy may be the differences in research contexts. Reference [21] focused on a beauty make-up app, where detailed product specifications are less critical. For instance, when purchasing lipsticks, users may prioritize visualizing the color in an AR app rather than examining detailed specifications. In contrast, selecting furniture often requires detailed and relevant information, such as dimensions, to support decision-making. Thus, informativeness significantly contributes to utilitarian value in this context.

This study further confirms that both hedonic and utilitarian values positively influence satisfaction and attitude, consistent with references [7], [8], and [34]. An AR furniture website that facilitates product selection and provides

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sufficient information (perceived as useful) enhances user satisfaction and fosters a positive attitude toward the platform [9]. Simultaneously, if the website is perceived as enjoyable and playful, users are more likely to develop favorable feelings toward it [9]. Notably, hedonic value has a stronger effect on satisfaction and attitude compared to utilitarian value, aligning with references [9] and [8].

Finally, consistent with references [51] and [52], satisfaction and attitude have positive influence on purchase intention. The AR furniture website enables customers to better understand furniture dimensions, designs, and multiple views by visualizing and interacting with virtual furniture. When the website successfully meets their needs during the decision-making process, customers are more likely to feel satisfied, develop a positive attitude, and ultimately have stronger purchase intentions.

IMPLICATIONS

This study used the S-O-R framework within the context of furniture e-commerce to explore how AR characteristics evoke hedonic and utilitarian values, ultimately influencing satisfaction, attitude, and purchase intention. The findings offer valuable insights for furniture companies aiming to integrate AR technology into their e-commerce platforms.

Firstly, AR developers should prioritize incorporating key AR characteristics, such as interactivity, informativeness, and technicality, into their furniture e-commerce platforms. For interactivity, developers should enable users to place, rotate, and move virtual furniture seamlessly. Additionally, providing comprehensive and detailed product information is essential to help customers evaluate options during the decision-making process.

Secondly, the findings highlight the critical role of hedonic value, which was found to have a stronger impact on both satisfaction and attitude compared to utilitarian value. To enhance hedonic value, developers could introduce gamification elements into their AR platforms. For instance, interactive challenges like “spot the difference” games related to furniture products or features that allow users to design virtual showrooms to earn e-coupons could be implemented. Such gamified elements create a sense of enjoyment, thereby boosting hedonic value. To enhance utilitarian value, developers could integrate virtual assistants that provide personalized recommendations for furniture placement and design. These tailored suggestions would streamline the product selection process, increasing the platform's perceived practical value and improving the overall user experience.

CONCLUSION, LIMITATIONS AND FUTURE RESEARCH AGENDA

Using the S-O-R model, this study empirically investigated the impact of AR characteristics on hedonic and utilitarian values in the context of AR furniture e-commerce. It also examined how these values influence customer satisfaction, attitude, and ultimately, purchase intention, successfully addressing all research questions.

First, the findings showed that all AR characteristics in the model predicted hedonic value, while only interactivity, technicality, and informativeness significantly predicted utilitarian value. Second, both hedonic and utilitarian values were identified as key drivers of satisfaction and positive attitude, which subsequently influenced purchase intention. Notably, hedonic value had a stronger effect on satisfaction and attitude compared to utilitarian value. Third, in the context of AR furniture e-commerce, focusing on all five AR characteristics is essential for enhancing hedonic value, while interactivity, technicality, and informativeness are particularly important for strengthening utilitarian value.

While the study provides valuable insights, it has several limitations. First, the use of convenience sampling to collect data may introduce biases and limit the generalizability of the findings, as the sample was selected based on accessibility and availability. Future research could address this limitation by incorporating qualitative methods to gain deeper insights into how AR characteristics affect consumer behavior or by collecting data from more diverse participant groups [9, 10]. Second, this study specifically focused on the effect of AR on purchase intention within the furniture industry. The proposed conceptual model may not be directly transferable to other industries, as each industry has unique characteristics. Future research could explore the role of AR in other contexts, such as tourism or hairdressing. Additionally, researchers could expand the model by including other AR characteristics, such as vividness [8] and spatial presence [55], to provide a more comprehensive understanding of AR's impact.

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