JKSCI

한국컴퓨터정보학회논문지
Journal of The Korea Society of Computer and Information
Vol. 29 No. 12, pp. 281-292, December 2024
https://doi.org/10.9708/jksci.2024.29.12.281

The Impact of Augmented Reality Features on Online Purchase Intentions: A Self-Determination Theory Perspective in E-Commerce

Zhi-Zhong Xiao*, Ji Yang*, Zi-Yang Liu**

*Student, School of Global Business, Kyonggi University, Suwon, Korea
**Professor, Dept. of Global Business, Kyonggi University, Suwon, Korea

[Abstract]

In recent years, the popularity of online shopping has grown rapidly. However, there is still a scarcity of research exploring the use of augmented reality (AR) technology in this context, especially concerning the role of internal consumer motivations. This study aims to address this research gap by examining the factors that affect consumers' online purchase intentions when interacting with AR technology, utilizing Self-Determination Theory as the guiding framework. The research involved gathering and analyzing 597 valid responses through the application of multiple regression and component analysis methods. The findings indicate that key elements of Self-Determination Theory, particularly perceived autonomy, perceived competence, and perceived relatedness, have a positive impact on consumers' online purchase intentions. Importantly, the study also identifies that consumers' attitudes toward AR technology mediate this relationship, further enhancing their intention to buy online. This research contributes significantly to the understanding of how psychological motivations, framed within Self-Determination Theory, can be applied to AR-enhanced online shopping environments. Additionally, the findings offer strategic insights for online marketers. By better understanding the ways in which AR technology impacts consumer attitudes and purchase motivations, marketers can more effectively incorporate AR into their digital platforms to boost engagement, satisfaction, and ultimately, sales. This study provides a valuable foundation for future research on AR and consumer behavior in e-commerce settings.

▸ **Key words**: Self-Determination Theory, AR technology, Online purchase intentions, Attitude, Consumer behavior

• First Author: Zhi-Zhong Xiao, Corresponding Author: Zi-Yang Liu
*Zhi-Zhong Xiao (469320047@qq.com), School of Global Business, Kyonggi University
*Ji Yang (297179390@qq.com), School of Global Business, Kyonggi University
**Zi-Yang Liu (morninglzy@hotmail.com) School of Global Business, Kyonggi University
• Received: 2024. 11. 04, Revised: 2024. 12. 03, Accepted: 2024. 12. 04.

http://www.ksci.re.kr pISSN:1598-849X | eISSN:2383-9945

[요 약]

최근 온라인 쇼핑의 인기가 급증했으나, 증강현실(AR) 기술 활용과 소비자의 내적 동기 영향에 대한 연구는 여전히 부족하다. 본 연구는 자결성 이론(Self-Determination Theory)을 바탕으로 AR 기술과의 상호작용이 소비자의 온라인 구매 의도에 미치는 요인을 분석하고자 한다. 다중 회귀분석을 통해 597개의 유효 응답을 분석한 결과, 자율성, 유능감, 관계성 지각이 구매 의도에 긍정적 영향을 미쳤으며, AR 기술에 대한 태도가 이를 매개하여 효과를 강화하는 것으로 나타났다.

이 연구는 AR 기반 온라인 쇼핑 환경에서 심리적 동기의 역할을 규명하며, 마케터들에게 AR을 효과적으로 통합해 소비자 참여와 판매를 증진시킬 전략적 시사점을 제공한다. 또한, 전자상거래에서 AR과 소비자 행동 연구의 기초 자료로 활용될 수 있다.

▸ **주제어**: 자결성 이론, AR 기술, 온라인 구매 의도, 태도, 소비자 행동

I. Introduction

In recent years, the importance of emerging technologies and their applications has been significantly enhanced and is projected to continue expanding. Technological advancements have eliminated barriers in the digital sphere, resulting in a substantial increase in online shopping activities. The global trend of online shopping through electronic devices, particularly mobile platforms, has been steadily rising [1]. In today's increasingly diverse environment, consumers are inundated with information about products and services. Additionally, retailers are required to address a range of issues, including high return rates and overall customer satisfaction in the online shopping process [2]. Retailers capable of attracting customers through personalized information and value are able to differentiate themselves and have the potential to foster strong customer engagement. One of the primary challenges is the lack of physical experience and interaction with products, a key distinction between online shopping and tactile interactions in physical stores [3].

Technology plays a crucial role in assisting retailers in reaching target audiences and facilitating more informed consumer decisions regarding products or services. Augmented reality (AR) technology addresses the gap between online and offline shopping by offering a sense of direct interaction. AR is characterized by a highly interactive, advanced, and spatially aware implementation, where digital objects, such as videos or 3D models, are superimposed onto the real-world view, creating the impression of physical presence [4]. It enables customers to virtually test products—such as furniture, clothing, cosmetics, or sunglasses—in any physical environment. Since AR promotes a "try-before-you-buy" experience, it possesses considerable potential for reducing return rates for retailers [1].

As AR becomes increasingly popular, extensive research has been conducted to examine the distinctions between AR online shopping and other online shopping methods. The primary goal is to identify the potential benefits of incorporating AR into the online shopping environment [5]. Previous research has suggested that the AR experience surpasses other online purchasing methods, primarily through three mechanisms: spatial presence, product tangibility, and product appeal, these factors jointly influence consumer purchase intention [6]. However, Javornik [5] emphasizes that perceived enhancement, interactivity, and flow are critical mechanisms influencing purchase intentions. Moreover, Yim, Chu and Sauer [7] propose that AR offers higher levels of novelty, immersion, enjoyment, and practicality, providing a

significant communication advantage. Additionally, Poushneh [8]asserts that AR enhances user satisfaction and purchase intentions.

Although numerous studies have been conducted, the effect of AR technology on online purchase attitudes has not yet been analyzed from the perspective of the social-psychological Self-Determination Theory (SDT). SDT is a rapidly growing paradigm, focusing on the interaction between intrinsic and extrinsic motivation. Gilal, Zhang, Paul and Gilal [9]urges marketing scholars to adopt SDT more extensively, offering strong arguments for its effectiveness in predicting consumer behavior. The theory highlights the significance of autonomy, competence, and relatedness in driving individual motivation and behavioral changes. Therefore, the purpose of this study is to address the challenges of online shopping, such as high return rates and lack of physical interaction, by exploring the potential of AR technology to enhance online purchase intentions. Grounded in SDT, the research examines how intrinsic psychological factors—perceived autonomy, competence, and relatedness—shape consumer attitudes and mediate their decision-making process. Innovation of this Study: 1 From a managerial perspective, as digital transformation continues to advance, increasing attention is being paid by brand managers to the application of AR technology in marketing. However, empirical research remains necessary to provide reliable guidance on how AR technology can be effectively leveraged to enhance consumers' purchase intentions and clarify the decision-making process when AR is used during online shopping. 2 From a theoretical perspective, this study addresses a research gap by introducing SDT into the context of online shopping. This not only extends the application of SDT within the e-commerce domain but also further validates its applicability and explanatory power across various scenarios.

II. Theory and hypothesis

1. AR in e-commerce

A strong connection is established between AR technology and user experience. AR is used to provide more realistic product presentations and enhanced user interaction, resulting in a higher-quality customer experience. It creates a mixed reality, where the environment is real but the depicted objects are virtual [7]. Additionally, AR incorporates unique features such as projecting the physical world onto virtual content, enhancing the interactivity of displayed virtual objects, and offering 3D views of virtual products [1]. Users are enabled to virtually try, verify, and inspect products from various angles and dimensions. These features are shown to directly influence product purchases, while images and videos can only provide an indirect experience [10].

In recent years, well-known companies and brands have introduced AR mobile applications to facilitate customer information retrieval. Online retailers such as IKEA, ASOS, Wayfair, and Amazon have incorporated "image search" functionality into their smartphone apps. This innovation allows users to capture images of items or products via their mobile cameras, which are then used to locate specific products within the app. For example, IKEA mobile app enables customers to seamlessly integrate virtual furniture into their physical environment. As AR adoption continues to increase, understanding its impact on consumer behavior, the immersive experiences it offers, and its influence on online purchase intention becomes increasingly essential [5].

2. Online purchase intention

Purchase intention is defined as a consumer's desire to acquire a product, typically derived from their evaluation and judgment of available options. This evaluation process leads to the decision to purchase the desired product. Motivated by this desire, consumers tend to initiate the purchase

[11]. The decision to shop online is influenced by consumers' overall attitudes. Some regard online shopping as leisurely or enjoyable, while others perceive it as a time-saving option. Lee, Sener, Mokhtarian and Handy [12]have shown that attitudes and perceptions significantly influence shopping decisions, with a positive attitude towards technology increasing the likelihood of online shopping.

VR and AR technologies are widely adopted in the retail industry, demonstrating significant potential to enhance purchase intention [13]. Yim, Chu and Sauer [7] argue that AR offers substantial communication advantages by fostering novelty, immersion, enjoyment, and perceived usefulness. These factors contribute to the formation of a positive attitude towards purchase intention. Additionally, AR applications provide consumers with more product information, further strengthening their purchase intention [14]. For retailers, understanding the impact of AR integration into the online purchase experience is essential to effectively leveraging AR technology to attract consumers and enhance their purchasing tendencies [2].

3. Attitude

Perceptions and understandings (both positive and negative) of one's ability to engage in specific behaviors are termed consumer attitudes. However, consumers attitudes toward adopting new technologies are driven by behavior. When making online purchases, it is argued by Molinillo, Navarro-García, Anaya-Sánchez and Japutra [15] that AR features enhance product visualization, thereby increasing consumer engagement. This increased engagement fosters a more positive attitude toward the brand and a better understanding of its functions, ultimately leading to higher purchase intentions. It is demonstrated by Recalde, Jai and Jones [16] that the level of interaction provided by AR is positively associated with consumers' purchase intentions. Additionally, AR-based online shopping experiences help consumers form favorable attitudes toward products, further enhancing their purchase intentions [6].

Yim, Chu and Sauer [7] finds that AR-based product displays are more effective than traditional web-based displays, offering greater immersion, media novelty, and enjoyment, thus improving attitudes toward the media and purchase intentions. When AR is used on a website, consumers tend to become more curious about the products, are more likely to revisit the site, and ultimately make a purchase. AR facilitates purchases and promotes online interaction, thus improving purchasing attitudes [17]. Based on this, the following hypothesis is proposed:

H1 : Attitude will positively influence online purchase intention.

4. SDT Theory

Self-determination theory (SDT) is a psychological framework that focuses on the intrinsic motivation (IM) underlying human behavior. It defines the basic psychological needs of autonomy, competence, and relatedness [18]. Autonomy refers to the need for individuals to feel in control of their actions, or to experience self-determination. When high levels of self-determination are perceived in an activity, individuals feel a greater sense of control, leading to stronger intrinsic motivation. Competence describes the need to feel capable and effective in interactions with the environment, with a belief in one's ability to achieve desired outcomes and succeed in the activity. Relatedness involves the need to establish meaningful connections with others [19]. Thus, if AR technology in online shopping is able to support and fulfill these three needs, consumer attitudes and purchase intentions are expected to be positively influenced.

SDT also serves as a useful framework for understanding human attitudes. Previous research suggests that a sense of autonomy tends to foster

more positive attitudes, as it gives individuals a sense of control over their thoughts and actions regarding specific objects or events [20]. Competence is often associated with positive attitudes toward new phenomena, as it increases confidence, belief in one's abilities, and comprehension [20]. When relatedness is satisfied, individuals are more likely to develop favorable attitudes toward an object or event, due to the sense of belonging and connection with others [20]. For instance, communities of consumers using the same technology can enhance feelings of relatedness. In the context of technology, studies have shown that individuals who feel both competent and autonomous in using technology are more likely to hold positive attitudes toward it. Attitude can also serve as a predictor of users' behavioral intentions toward adopting new technologies [21]. In other areas of marketing research, Wang, Zhao and Pan [22] demonstrate that self-determination influences consumers' attitudes toward environmental protection, which, in turn, affects their purchase intentions for green products. Similarly, Shahid, Adil, Sadiq and Dash [23] suggest that self-determination shapes consumers' attitudes toward luxury goods, thereby influencing their purchase intentions for these products. Therefore, based on the above research findings, this paper proposes the following hypotheses regarding the influence of consumers' intrinsic psychological motivations on online purchase intentions, integrating SDT theory and AR technology in the context of online shopping:

H2: Perceived autonomy will positively influence attitude.

H3: Perceived competence will positively influence attitude.

H4: Perceived relatedness will positively influence attitude.

H5: In the Online shopping with AR process, attitude mediates the relationship between perceived autonomy and online purchase intention.

H6: In the Online shopping with AR process, attitude mediates the relationship between perceived competence and online purchase intention.

H7: In the Online shopping with AR process, attitude mediates the relationship between perceived relatedness and online purchase intention.

In summary, the proposed hypothetical model is shown as Figure 1.

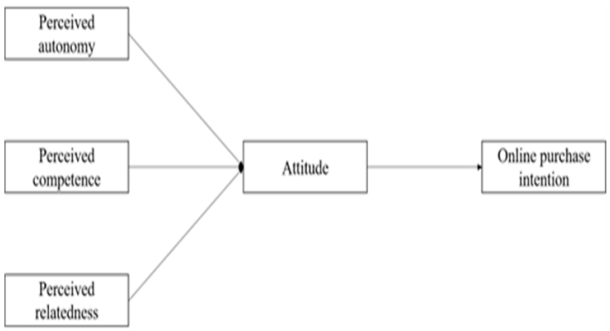

Fig. 1. Research model.

III. Methods and analysis

1. Measures and validation

In this study, data was collected through an online platform (Questionstar). The survey consisted of questions based on previously established scales that were modified for this particular study. Each question in the survey was rated on a five-point scale from "totally disagree" (1) to " totally agree" (5).

The measurement is composed of three sections. In the first section, SDT is assessed. Perceived autonomy is evaluated using three items adapted from Ke and Zhang [24], while perceived competence (PC) and perceived relatedness (PR) are assessed through three items adapted from Gupta [25]. The second section examines consumer attitudes toward the use of AR in online shopping, based on three items from Taylor and Todd [26]. The third section assesses online purchase intention., referencing three items from Chandran and Morwitz [27].

2. Sample and Procedure

The research subjects were selected from consumer groups in eastern China. This region was chosen because it is recognized as one of the most active areas for online consumption in the country. High levels of acceptance and usage of emerging shopping technologies have been observed among consumers in this region, leading to frequent use of AR technology in online shopping. All participants in this study had previously utilized the AR try-on feature on JD.com.

The AR try-on feature on JD.com has been implemented to utilize real-time images captured by users' cameras, with 3D models or virtual effects of products precisely overlaid onto these images. This has been achieved through the application of computer vision and artificial intelligence algorithms, enabling virtual try-ons of clothing, makeup, or accessories. The technology has provided users with a shopping experience closely resembling reality, simulated the actual effects of products during the try-on process, and significantly improved the efficiency and accuracy of purchase decisions.

Data were collected via an online survey conducted using Questionnaire Star in August 2024, resulting in 670 responses. After removing responses that were completed too quickly, those with uniform answer patterns, and those from participants who had not used AR technology for online shopping, 597 valid questionnaires remained. The demographic data of the respondents are shown in Table 1. The sample size was determined the sample size for PLS path modeling regression should be at least ten times the number of variables.

The initial stage includes descriptive statistics, followed by an evaluation of the measurement model to assess validity and reliability. Subsequently, the structural model is tested to determine its suitability for hypothesis testing. The following sections offer a detailed account of the comprehensive analysis and new findings from this study.

Table 1. Demographic information

Particulars	Description	Values	%
Gender	Male	324	54.3
	Female	273	45.7
Age	18-25	169	28.3
	26-40	257	43.0
	41-55	91	15.2
Annual income	More than 56	80	13.4
	less than 8,000 (USD)	176	29.5
	8,001-16,000 (USD)	268	44.9
	16,001-32,000(USD)	73	12.2
	32,001-64,000	54	9.0
	More than 64,001	26	4.4
Education level	High school and below	162	27.1
	College	115	19.3
	University	249	41.7
	Master's degree or higher	71	11.9

IV. Data analysis and results

The evaluation of the measurement model entailed assessing both its reliability and validity to ensure the accurate measurement of the constructs by their respective indicators. Findings from the analysis indicated that all factor loading values within the sample were at 0.7 or higher. Structural reliability was confirmed through the utilization of Cronbach's alpha and composite reliability tests, with all outcomes showcasing robust reliability, surpassing the 0.7 threshold. Furthermore, the average variance extracted (AVE) surpassed the acceptable threshold of 0.5, indicating adequate internal consistency. The detailed results of the validity and reliability assessments are elaborated in Table 2.

Table 2. Results of reliability and validity

Construct	Loadings	VIF	Cronbach's alpha	CA	AVE
PA1	.838	1.701	.768	.771	.682
PA2	.820	1.661			
PA3	.820	1.430			
PC1	.835	1.796	.815	.823	.729
PC2	.865	1.974			
PC3	.861	1.698			
PR1	.875	1.983	.805	.806	.720
PR2	.841	1.678			
PR3	.829	1.687			
Attitude1	.870	1.837	.812	.818	.726
Attitude2	.841	1.674			
Attitude3	.845	1.861			
OPI1	.843	1.741	.827	.828	.743
OPI2	.871	1.990			
OPI3	.872	1.970			

Discriminant validity was confirmed using the Fornell and Larcker method, which examines whether the square root of the Average Variance Extracted (AVE) on the diagonal exceeds the correlation coefficients between the constructs. According to this criterion, discriminant validity is established, as the minimum AVE value in the sample (0.826) surpasses the highest correlation coefficient (0.420). The outcomes of the discriminant validity assessment are presented in Table 3. Additionally, discriminant validity was assessed using the heterotrait-monotrait (HTMT) ratio of correlations, with all HTMT values below 0.9, indicating sufficient discriminant validity. Model fit was evaluated using the Standardized Root Mean Square Residual (SRMR), with a value below 0.09 indicating suitability for path analysis. The model fit result is 0.056 and the result passes the test that the model is of good use.

Table 3. Discriminant validity (Fornell-Larcker criterion)

	Attitude	OPI	PA	PC	PR
Attitude					
OPI	0.445				
PA	0.312	0.492			
PC	0.331	0.573	0.463		
PR	0.323	0.516	0.293	0.328	

Table 4. Discriminant validity (HTMT)

	Attitude	OPI	PA	PC	PR
Attitude	0.852				
OPI	0.367	0.862			
PA	0.248	0.393	0.826		
PC	0.271	0.471	0.366	0.854	
PR	0.264	0.420	0.231	0.266	0.848

The model's predictive accuracy was initially evaluated using the coefficient of determination (R2), with adjusted R2 values for attitude and online purchase intention recorded at 0.126 and 0.133, respectively. These values adhere to established standards, where R2 values of 0.75, 0.50, and 0.25 are deemed significant, moderate, and weak, respectively. Further assessment was conducted using the Stone-Geisser (Q2) criterion, a conservative and robust measure involving blindfolding procedures. The Q2 values for attitude and online purchase intention were 0.090 and 0.099, respectively, both exceeding zero, thus affirming the model's predictive relevance. This indicates high-quality relevance of the model for the endogenous constructs. Additionally, researchers computed the effect size (F2) of their findings to gauge the impact of potential constructs on the endogenous constructs. The F2 values fell within established thresholds for small, medium, and large effects, which are 0.02, 0.15, and 0.35, respectively.

Table 5. f-square

	f-square
PA → Attitude	0.020
PC → Attitude	0.027
PR → Attitude	0.036
Attitude → OPI	0.156

At a significance level of 0.05, structural relationships were assessed utilizing a nonparametric bootstrapping technique. This method involved generating 5,000 subsamples from the original dataset with replacement to approximate t-values for testing the significance of structured paths. Pathways were considered significant at the 0.05 level if the t-value exceeded 1.96. The outcomes, detailed in Table 6 of the structural equation modeling analysis, indicated statistically significant pathways from attitude to online purchase intention (β= 0.367, p <0.001), as well as from perceived autonomy(β=0.144, p<0.001) , perceived competence(β=0.169, p<0.001) and perceived relatedness(β=0.186, p<0.001) to attitude. Moreover, the pathway from green innovation to sustainable development was also statistically significant. Consequently, hypotheses 1 through 4 garnered support.

Table 6. Hypothesis testing

Hypothesis	Constructs	C	S.D	t-value	p-value	Decision
H1	Attitude → OPI	.367	.034	10.882	0.000 ***	Supported
H2	PA → Attitude	.144	.038	3.766	0.000 ***	Supported
H3	PC → Attitude	.169	.038	4.490	0.000 ***	Supported
H4	PR → Attitude	.186	.038	4.848	0.000 ***	Supported

Notes: ***p<0.001, **p<0.01, *p<0.05

This study employed a nonparametric bootstrapping method to assess the mediating effects, analyzing the significance of proposed indirect effects. The analysis employed percentile bootstrap and bias-corrected bootstrap methods, each with 5000 re-samples, to examine specific indirect effects. The findings revealed significant mediation, with a p-value less than 0.05. For the statistical analysis, the variance accounted for (VAF) was calculated to evaluate the strength of the adjustments and quantify the extent of the indirect effects on the total effect. The VAF ranges from 0% to 100%, with values exceeding 80% indicating full mediation, 20% to 80% indicating partial mediation, and values below 20% indicating no mediation. The final VAF value was calculated as 1, confirming the presence of full mediation. The results have been revised accordingly.

As delineated in Table 7, the mediating effect of attitude (β=0.053, t=3.336, $p < 0.005$) substantiates the mediation hypothesis (H5), indicating that attitude serves as a partial mediator in the positive relationship between perceived autonomy and online purchase intention. Similarly, concerning the association between perceived competence and online purchase intention, mediated by attitude (β =0.062, t=3.807, $p < 0.001$), the findings also uphold the mediation hypothesis (H6), underscoring that attitude partially mediates the positive impact of perceived competence on online purchase intention. And, concerning the association between perceived relatedness and online purchase intention, mediated by attitude (β=0.068, t=4.145, $p < 0.001$), the findings also uphold the mediation hypothesis (H7), underscoring that attitude partially mediates the positive impact of perceived relatedness on online purchase intention.

V. Results and discussion

1. Discussion

This study, theoretical model was constructed based on the use of make research hypotheses about the impact of SDT using AR technology on online purchase intentions, and the hypothesized relationships were tested through regression analysis and Bootstrap mediated effects tests.

First, attitude have positive impacts on online purchase intention (H1). The study further elaborates on the role of attitude in shaping variable relationships within online retail. The findings are supported by Koththagoda and Herath [28], who emphasize that consumer attitudes in an online environment significantly influence purchase intentions. Consumers familiar with using AR technology in online shopping gain a clearer understanding of product features, facilitating more informed purchasing decisions. Therefore, it is

Table 7. Testing the mediation effects

Hypothesis	Constructs	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	t-Value	p-Value	Mediation
H5	PA → Attitude → OPI	0.053	0.055	0.016	3.336	0.001**	Complete mediation
H6	PC → Attitude → OPI	0.062	0.063	0.016	3.807	0.000***	Complete mediation
H7	PR → Attitude → OPI	0.068	0.069	0.016	4.145	0.000***	Complete mediation

Notes: ***p<0.001, **p<0.01, *p<0.05

recommended that brand managers increase the availability of AR in online stores to attract more consumers and promote both product exploration and purchase.

Second, the research also finds that perceived autonomies have a positive impact on attitude (H2). This study further examines the variable relationship between perceived autonomy and consumer attitudes. Teangsompong and Sawangproh [29] reinforce these findings, highlighting that perceived autonomy significantly influences consumer attitudes toward products. When consumers are given the freedom to choose whether to use AR technology, their sense of control is enhanced, which improves their decision-making during online shopping. Thus, it is advised that brand managers offer consumers the option to use AR technology, as doing so can foster a stronger sense of perceived autonomy, improve attitudes toward the technology, and ultimately increase purchase intentions.

Third, the research finds that perceived competences have a positive impact on attitude (H3). In the context of online shopping with AR technology, consumers' perceived competence is found to positively influence their attitudes toward its use. Consumers expect to maintain control over the purchasing process, and AR technology enhances this by offering a more immersive shopping experience. It is therefore recommended that brand managers ensure the AR interface is user-friendly and intuitive, minimizing technological barriers. Furthermore, consumers should be given the option to customize product details in AR, such as color, size, and material, to suit their preferences. By providing greater control, consumer engagement in the shopping process can be strengthened, ultimately increasing their purchase intentions.

Fourth, the research also finds that perceived relatedness can have a positive impact on attitude (H4). This study further examines the relationship between perceived relatedness and attitudes toward AR technology. Im, Sung, Lee and Kok [30] support these findings, highlighting that perceived relatedness positively impacts consumer attitudes during online shopping. When consumers receive personalized service through AR technology, their acceptance of and attitudes toward AR improve. Furthermore, consumers are more likely to engage with others who also use AR, and this sense of community further strengthens their preference for AR technology. It is recommended that brand managers offer real-time support throughout the AR shopping experience. This can be facilitated through virtual customer service assistants or live chat features within the AR environment to address consumer concerns. Additionally, brands should create virtual shopping communities, enabling consumers to interact with other users, share experiences, and review products within the AR space. This approach not only fosters a sense of community but also generates positive word-of-mouth, attracting more users to adopt AR shopping.

Fifth, when people buy online, attitude mediate the relationship between perceived autonomy, perceived competences, perceived relatedness and purchase intention (H5, H6, H7). When AR technology is integrated into online shopping, perceived autonomy, competence, and relatedness can enhance consumers' purchase intentions by shaping their attitudes toward the use of AR technology. Thus, consumer attitudes toward AR technology can be improved by brand managers by addressing the intrinsic motivations for its use, ultimately enhancing consumers' online shopping intentions. Perceived relatedness can be enhanced by creating topics for discussion and fostering community engagement. Perceived competence can be improved by allowing users to adjust experience parameters and offering a diverse range of choices. To strengthen perceived autonomy, users should be given control over turning the AR function on or off at any time, and a low-pressure shopping environment should be created to avoid aggressive sales tactics.

2. Limitation and future research

This study has several limitations that should be addressed. First, the sample was limited to consumers in Eastern China, which may limit the generalizability of the findings to other geographic regions. Cultural factors and the adoption of AR technology may vary across different contexts, potentially influencing consumers' online purchase intentions. Future research could address these limitations by expanding the geographic scope of the study to include diverse cultural and regional settings. Comparative studies between countries with varying levels of AR adoption would offer insights into how different markets respond to AR technology in online shopping. Second, the research primarily focuses on three psychological needs from Self-Determination Theory (SDT)—autonomy, competence, and relatedness—but other intrinsic and extrinsic motivators were not considered. Future research could explore other motivational constructs beyond autonomy, competence, and relatedness, such as perceived risk, trust, or perceived enjoyment, to better understand their role in influencing online purchase intentions. Third, the study assumes a general application of AR in online shopping, but the technology can vary significantly depending on its implementation. Further research is needed to assess how different types of AR experiences impact consumer behaviors in specific contexts. Long-term studies would be valuable to understand how consumer attitudes and behaviors evolve as AR technology becomes more integrated into the online shopping experience. Examining how repeated exposure to AR influences consumer perceptions and purchasing habits over time could yield deeper insights. Further research could compare the impact of different AR applications and platforms on consumer behavior, focusing on aspects such as usability, interactivity, and realism. This would help businesses understand which specific AR features are most effective in driving purchase intentions across various product categories.

REFERENCES

[1] A. R. Smink, S. Frowijn, E. A. van Reijmersdal, G. van Noort, and P. C. Neijens, "Try online before you buy: How does shopping with augmented reality affect brand responses and personal data disclosure," Electronic Commerce Research and Applications, (2019), Vol. 35, pp. 100854. DOI: 10.1016/j.elerap.2019.100854

[2] X. Fan, Z. Chai, N. Deng, and X. Dong, "Adoption of augmented reality in online retailing and consumers' product attitude: A cognitive perspective," Journal of Retailing and Consumer Services, (2020), Vol. 53, pp. 101986. DOI: 10.1016/j.jretconser.2019.101986

[3] S. Overmars, and K. Poels, "Online product experiences: The effect of simulating stroking gestures on product understanding and the critical role of user control," Computers in Human Behavior, (2015), Vol. 51, pp. 272-284. DOI: 10.1016/j.chb.2015.04.033

[4] N. Shabani, and A. Hassan, "Augmented reality for tourism service promotion in Iran as an emerging market, Virtual and Augmented Reality: Concepts, methodologies, tools, and applications," IGI Global, (2018)

[5] A. Javornik, Augmented reality: Research agenda for studying the impact of its media characteristics on consumer behaviour, Journal of Retailing and Consumer Services, (2016), Vol. 30, pp. 252-261. DOI: 10.1016/j.jretconser.2016.02.004

[6] T. Verhagen, C. Vonkeman, F. Feldberg, and P. Verhagen, "Present it like it is here: Creating local presence to improve online product experiences, Computers in human behavior," (2014), Vol. 39, pp. 270-280. DOI: 10.1016/j.chb.2014.07.036

[7] M. Y.-C. Yim, S.-C. Chu, and P. L. Sauer, "Is augmented reality technology an effective tool for e-commerce? An interactivity and vividness perspective," Journal of interactive marketing, (2017), Vol. 39, No. 1, pp. 89-103. DOI: 10.1016/j.intmar.2017.04.001

[8] A. Poushneh, "Augmented reality in retail: A trade-off between user's control of access to personal information and augmentation quality," Journal of Retailing and Consumer Services, (2018), Vol. 41, pp. 169-176. DOI: 10.1016/j.jretconser.2017.12.010

[9] F. G. Gilal, J. Zhang, J. Paul, and N. G. Gilal, "The role of self-determination theory in marketing science: An integrative review and agenda for research," European Management Journal, (2019), Vol. 37, No. 1, pp. 29-44. DOI: 10.1016/j.emj.2018.10.004

[10] P. Kowalczuk, C. Siepmann, and J. Adler, "Cognitive, affective, and behavioral consumer responses to augmented reality in e-commerce: A comparative study," Journal of Business Research, (2021), Vol. 124, pp. 357-373. DOI: 10.1016/j.jbusres.2020.10.050

[11] W. Y. Wu, H. Y. Lu, Y. Y. Wu, and C. S. Fu, "The effects of product scarcity and consumers' need for uniqueness on purchase intention," International journal of consumer studies, (2012), Vol. 36, No. 3, pp. 263-274. DOI: 10.1111/j.1470-6431.

2011.01000.x

[12] R. J. Lee, I. N. Sener, P. L. Mokhtarian, and S. L. Handy, "Relationships between the online and in-store shopping frequency of Davis, California residents," Transportation Research Part A: Policy and Practice, (2017), Vol. 100, pp. 40-52. DOI: 10.1016/j.tra.2017.03.001

[13] M. Wedel, E. Bigné, and J. Zhang, "Virtual and augmented reality: Advancing research in consumer marketing," International Journal of Research in Marketing, (2020), Vol. 37, No. 3, pp. 443-465. DOI: 10.1016/j.ijresmar.2020.04.004

[14] J. Scholz, and K. Duffy, "We ARe at home: How augmented reality reshapes mobile marketing and consumer-brand relationships," Journal of Retailing and Consumer Services, (2018), Vol. 44, pp. 11-23. DOI: 10.1016/j.jretconser.2018.05.004

[15] S. Molinillo, A. Navarro-García, R. Anaya-Sánchez, and A. Japutra, "The impact of affective and cognitive app experiences on loyalty towards retailers," Journal of Retailing and Consumer Services, (2020), Vol. 54, pp. 101948. DOI: 10.1016/j.jretconser.2019.101948

[16] D. Recalde, T. C. Jai, and R. P. Jones, "I can find the right product with AR! The mediation effects of shopper engagement on intent to purchase beauty products," Journal of Retailing and Consumer Services, (2024), Vol. 78, pp. 103764. DOI: 10.1016/j.jretconser.2024.103764

[17] T.-L. Huang, and S. Liao, "A model of acceptance of augmented-reality interactive technology: the moderating role of cognitive innovativeness," Electronic Commerce Research, (2015), Vol. 15, pp. 269-295. DOI: 10.1007/s10660-014-9163-2

[18] R. M. Ryan, Self-determination theory: Basic psychological needs in motivation, development, and wellness: Guilford Press, 2017

[19] J. Bergdahl, R. Latikka, M. Celuch, I. Savolainen, E. S. Mantere, N. Savela, and A. Oksanen, "Self-determination and attitudes toward artificial intelligence: Cross-national and longitudinal perspectives," Telematics and Informatics, (2023), Vol. 82, pp. 102013. DOI: 10.1016/j.tele.2023.102013

[20] R. M. Ryan, The Oxford handbook of self-determination theory: Oxford University Press, 2023

[21] S. Chatterjee, K. K. Bhattacharjee, C.-W. Tsai, and A. K. Agrawal, "Impact of peer influence and government support for successful adoption of technology for vocational education: A quantitative study using PLS-SEM technique," Quality & Quantity, (2021), Vol. 55, pp. 2041–2064. DOI: 10.1007/s11135-021-01100-2

[22] Y. Wang, J. Zhao, and J. Pan, "The investigation of green purchasing behavior in China: a conceptual model based on the theory of planned behavior and self-determination theory," Journal of Retailing and Consumer Services, (2024), Vol. 77, pp. 103667. DOI: 10.1016/j.jretconser.2023.103667

[23] S. Shahid, M. Adil, M. Sadiq, and G. Dash, "Why do consumers consume masstige products? A cross-cultural investigation through the lens of self-determination theory," Journal of Retailing and Consumer Services, (2024), Vol. 76, pp. 103607. DOI: 10.1016/j.jretconser.2023.103607

[24] W. Ke, and P. Zhang, "The effects of extrinsic motivations and satisfaction in open source software development," Journal of the Association for Information Systems, (2010), Vol. 11, No. 12, pp. 5. DOI: 10.17705/1jais.00251

[25] K. P. Gupta, "Investigating the adoption of MOOCs in a developing country: Application of technology-user-environment framework and self-determination theory," Interactive Technology and Smart Education, (2020), Vol. 17, No. 4, pp. 355-375. DOI: 10.1108/itse-06-2019-0033

[26] S. Taylor, and P. A. Todd, "Understanding information technology usage: A test of competing models," Information systems research, (1995), Vol. 6, No. 2, pp. 144-176. DOI: 10.1287/isre.6.2.144

[27] S. Chandran, and V. G. Morwitz, "Effects of participative pricing on consumers' cognitions and actions: A goal theoretic perspective," Journal of Consumer Research, (2005), Vol. 32, No. 2, pp. 249-259. DOI: 10.1086/432234

[28] K. Koththagoda, and H. Herath, "Factors influencing online purchasing intention: The mediation role of consumer attitude," Journal of Marketing and Consumer Research, (2018), Vol. 42, No. 2003, pp. 66-74.

[29] T. Teangsompong, and W. Sawangproh, "Understanding online purchase intention of plant-based foods: Exploring causal factors and moderating role of self-efficacy within the SOR theory," Heliyon, (2024), Vol. 10, No. 10, e30785. DOI: 10.1016/j.heliyon.2024.e30785

[30] H. Im, B. Sung, G. Lee, and K. Q. X. Kok, "Let voice assistants sound like a machine: Voice and task type effects on perceived fluency, competence, and consumer attitude," Computers in Human Behavior, (2023), Vol. 145, pp. 107791. DOI: 10.1016/j.chb.2023.107791

Authors

Zhi-Zhong Xiao Received the B.A. degree in Traffic Engineering from North China University of Water Resources and Electric Power, China, in 2012, M.A. degree in Traffic Engineering from Chongqing Jiaotong University, China, in 2016, respectively. Mr. Xiao joined the faculty of the Department of Global Business at Kyonggi University, Suwon, Korea, in 2023. He is currently a doctoral student in global business. Kyonggi University. He is interested in Management Information Systems, E-business etc.

Ji Yang Received the B.A. degree in Management from HuangHuai University, China, in 2013, M.A. degree in Management from Zhongyuan University of Technology, China, in 2016, respectively. Mr. Yang joined the faculty of the Global Business at Kyonggi University, Suwon, Korea, in 2023. He is currently a doctoral student in global business. Kyonggi University. He is interested in Quality Management, E-business etc.

Zi-Yang Liu Received the B.A. degree in Management from Army superintend institute of shijiazhuang China PLA ,China, in 2006, M.A. degree and Ph.D. degree in Management from Kyonggi University, Korea, in 2010 and 2013, respectively. Dr. Liu joined the faculty of the Global Business Kyongggi University, Korea in 2015. He is currently a professor of Global Business at Kgonggi University. He is interested in Quality Management. Management Information Systems, International economics, E-business etc.