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The Effect of Augmented Reality Shopping Applications on Purchase Intention

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Abstract

Augmented reality is a new technological breakthrough that helps e-commerce delivers an online shopping experience with quality of offline shopping. This is possible due to the capability of augmented reality technology that allows consumers to interact and to try products through the virtual world. This technology has not been widely adopted by e-commerce in Indonesia. In this study, we analyzed the effect of this technology on purchase intention through e-consumer experience in the form of perceived enjoyment and usefulness to 89 consumers. Our findings revealed that virtual presence significantly affects the enjoyment and usefulness directly and indirectly to purchase intention. In addition, the device also significantly affects the enjoyment and usefulness directly. Finally, the usefulness is proven to significantly affect purchase intention.

Keywords: *augmented reality; e-commerce; purchase intention; PLS-SEM*

Abstrak

Augmented reality adalah terobosan teknologi baru yang membantu e-commerce memberikan pengalaman belanja online dengan kualitas belanja offline. Hal ini dimungkinkan karena kemampuan teknologi augmented reality yang memungkinkan konsumen berinteraksi dan mencoba produk melalui dunia virtual. Teknologi ini belum banyak diadopsi oleh e-commerce di Indonesia. Dalam penelitian ini, kami menganalisis pengaruh teknologi ini terhadap minat pembelian melalui pengalaman konsumen elektronik dalam bentuk kesenangan yang dirasakan dan manfaatnya bagi 89 konsumen. Temuan kami mengungkapkan bahwa kehadiran virtual secara signifikan mempengaruhi aspek kesenangan dan kegunaan secara langsung maupun tidak langsung terhadap minat pembelian. Selain itu, perangkat ini juga secara signifikan mempengaruhi aspek kesenangan dan kegunaannya secara langsung. Terakhir, aspek manfaat terbukti secara signifikan mempengaruhi minat pembelian.

Kata kunci: *augmented reality; e-commerce; minat pembelian; PLS-SEM*

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INTRODUCTION

The emergence of e-commerce has changed the way producers sell their products by making use of technology, selling at competitive prices, and reaching wider consumer segmentation through communication and transactions via the internet (Desti & Shanthi, 2015). These advantages have granted e-commerce a very significant and emerging development of e-commerce websites offering a wide range of products. However, these developments have not been able to completely cover for the on-site shopping experiences (Lu & Smith, 2008). On-site shopping gives an edge where consumers actually can interact with the product directly. They are able to see, to touch, and to try the product directly. Even consumers can also interact with the seller or the shop assistant to inquire any information about the product. These experiences are not fully acquired by consumers when they shop through e-commerce. As a result, it is often found that consumers are disappointed when they reach the product in their hands.

Therefore augmented reality is one of the new breakthroughs that offer solutions to the above problems through technology that can bring virtual world into the real world. Through this technology, consumers are able to do online shopping with on-site shopping experience. Since, application of augmented reality in e-commerce is still relatively new, studies that analyze the augmented reality in relation to the factors that encourage consumers to use the technology and its impact on purchase intention is still limited. Prior studies have analyzed the impact of AR on e-commerce, including technology effectiveness, consumer experience and satisfaction (Desti & Shanthi, 2015; Rese et al., 2017; Yim et al., 2017; Zhu et al., 2004). However, the analysis of the effect on purchase intention is still modest. Purchase intention is the next stage of consumer satisfaction. This variable measures the desire of consumers to make purchases in the future. The variable is a measure of actual buying behavior (Morrison, 1979). Therefore, in this study, we focus on the impact on purchase intention of products.

Augmented reality is an integration between the real world and the virtual world. This technology has greatly helped consumers to see the real world of virtual worlds that are incorporated into the real world. This technology provides a breakthrough way to interact with virtual objects that cannot be accessed directly by consumers (Azuma, 1997). This technology has proven to provide many advantages in e-commerce, including increasing sales, developing brand, and shaping consumer perceptions (Desti & Shanthi, 2015). In online shopping experience, this technology enables consumer to try on products through virtual worlds (Ma & Choi, 2007).

A consumer experience of augmented reality in e-commerce is very important in influencing their evaluations and purchasing decisions. Interactivity and vividness are two augmented reality qualities that influence consumer evaluation (Ariely, 2000; Yim et al., 2017). Furthermore, the term virtual presence as an indicator to evaluate the level of reality of the virtual world offered by augmented reality (Slater & Steed, 2000). Virtual presence is proven to improve the quality of consumer experience (Tussyadiah et al., 2018). In addition to the virtual presence, another important factor in improving the quality of consumer experiences is the device used to increase consumer experiences of augmented reality (Nincarean et al., 2013; Rapaccini et al., 2014). A high quality

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experiences will lead to high perceived technology usefulness and enjoyment (Van Noort et al., 2012).

Usefulness is an indicator to measure how effective and efficient technology is used to help consumers find and obtain the information they need, evaluate products and make purchases (Kim & Forsythe, 2008). Usefulness is also an important indicator that explains the Electronic Technology Acceptance Model (TAM) (Davis, 1989). In addition to the usefulness, another indicator that explains TAM is enjoyment (Davis et al., 1992). Enjoyment measure aspects of pleasure and enjoyment of technology use (Childers et al., 2001). Both of these variables proved significant consumer shopping behavior and purchase intentions (He et al, 2018; Heijden, 2000; Huang & Hsu Liu, 2014; Poushneh & Vasquez-Parraga, 2017).

METHODS

Randomly collected data were conducted with 89 consumers of e-commerce, aged between 15 and 35 years old and worked as high school and university students (73 people), employees (11 people), entrepreneurs (3 people), housewives (1 person) and others (1 person) at South Jakarta, Indonesia. Surveys were distributed through online google forms. To analyze the impact of augmented reality on e-commerce purchase intention, the indicators used are virtual presence, device, perceived usefulness, perceived enjoyment, and purchase intention. The quality of augmented reality is measured through virtual presence and device (Ariely, 2000; Slater & Steed, 2000; Yim et al., 2017) as well as the virtual presence (Yim et al., 2017) and the device (Nincarean et al., 2013; Rapaccini et al., 2014). The consumer experience is measured through perceived usefulness (Yim et al., 2017) and perceived enjoyment indicators (Chang, Sun, Pan, & Wang, 2015; Mathwick et al., 2001). Finally, purchase intention is employed as an endogenous latent variable (He et al., 2018). All of the measurements are obtained on a five-point Likert scale. The indicators used can be observed in Table 1.

The Partial Least Square path modeling (PLS-PM) was performed to test the research hypotheses by using the SmartPLS 3.0 software. The small sample size will result in a biased estimation of the covariance-based path modeling so that maximum likelihood functionality was not possible. Therefore, the use of PLS-PM is considered very appropriate for small sample quantities (<100) (Hoyle, 1999). The stages of analysis using this method consist of outer model analysis, inner model analysis, and hypothesis testing.

Outer model analysis is used to evaluate whether the measurement scales used are valid and reliable. It consists of convergent validity test, discriminant validity test, and undimensionality test. The inner model analysis is used to evaluate whether the structural model formed is robust. The analysis consists of evaluating the coefficient of determination (R^2), predictive relevance (q^2), and Goodness of Fit (GoF). Finally, hypothesis testing is performed by evaluating the value of t-statistics and coefficients with a hypothesis based on the theory and previous studies.

Table 1. Variables and indicators used in the study

Constructs	Dimensions	Descriptions
Virtual presence	X1	Augmented reality helps me visualize virtual objects become visible
	X2	Augmented reality provides information about virtual objects
Device	X3	I use augmented reality through smartphone or tablet
	X4	Augmented reality requires no device other than my smartphone or laptop
	X5	Applications with augmented reality can be used through a variety of gadgets everywhere
	X6	Augmented reality can be accessed easily
	X7	The use of augmented reality in the application is easy to understand
	X8	Augmented reality is a medium that excels in the delivery of messages with text, sound, images, video, and animation
Enjoyment	X9	Applications that use augmented reality have many features and are more interesting
	X10	Augmented reality makes the app more interactive
	X11	Online shopping apps that use augmented reality features is more impressive and special
Usefulness	X12	I feel augmented reality in online shopping provides more information
	X13	Online shopping using augmented reality provides a variety of product options
	X14	Online shopping using augmented reality gives you more options to view or try products in the real world
	X15	Shopping online using augmented reality gives more choice of interesting features
	X16	Online shopping with augmented reality simplifies access to reviews and ratings from other customers
Purchase intention	X17	I will re-purchase in the e-commerce websites that uses augmented reality
	X18	I chose to look for information on the e-commerce websites that use augmented reality before buying a product
	X19	I prefer online shopping websites that use augmented reality

RESULTS AND DISCUSSION

The results in Table 2 indicate that the research model has good convergent and discriminant validity. All loading factor values are greater than 0.50. The Cronbach's alpha, Rho A, and composite reliability are also greater than 0.70. Moreover, the Average Variance Extracted (AVE) values of all constructs are greater than 0.50.

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Table 2. Result of measurement model

Constructs	Dimensions	Std. Loadings	Average Variance Extracted (AVE)	Composite reliability	Cronbach's Alpha	Rho A
Virtual presence	X1	0.923	0.847	0.917	0.820	0.820
	X2	0.918				
Device	X3	0.553	0.510	0.859	0.807	0.843
	X4	0.543				
	X5	0.806				
	X6	0.748				
	X7	0.823				
	X8	0.758				
Enjoyment	X9	0.748	0.684	0.866	0.767	0.779
	X10	0.846				
	X11	0.882				
Usefulness	X12	0.814	0.714	0.926	0.900	0.902
	X13	0.846				
	X14	0.852				
	X15	0.884				
	X16	0.829				
Purchase intention	X17	0.856	0.733	0.892	0.818	0.822
	X18	0.861				
	X19	0.850				

Furthermore Table 3 indicates that the model has good discriminant validity. The evaluation of Fornell-Lacker criterion revealed that the correlation between each construct with its own construct is higher than other constructs (Golob, 2001).

Table 3. Fornell-Lacker criterion results

	Device	Enjoyment	Purchase intention	Usefulness	Virtual presence
Device	0.714				
Enjoyment	0.806	0.827			
Purchase intention	0.769	0.683	0.856		
Usefulness	0.766	0.755	0.839	0.845	
Virtual presence	0.758	0.852	0.661	0.747	0.920

The result of evaluation of the structural model in the table 4 indicates that virtual presence has a direct positive effect on the enjoyment and usefulness (coeff. = 0.565 and coeff = 0391 respectively), and indirectly to purchase intention (coeff. = 0.359) supporting hypothesis 1a and 1b. The device has a significant direct positive effect on the enjoyment

and usefulness (coeff. = 0.378 and coeff. = 0.469 respectively), but does not significantly affect purchase intention indirectly (coeff. = 0.397) supporting hypotheses 2a and 2b. Finally, usefulness has been indicated to have a positive effect on purchase intention (coeff. = 0.752) in favor of hypothesis 3.

Table 4. Direct, indirect, and total effects of PLS-SEM

	Direct effect	Indirect effect	Total effect
Virtual presence -> Enjoyment	0.565	-	0.565***
Virtual presence -> Usefulness	0.391	-	0.391**
Virtual presence -> Purchase intention	-	0.359	0.359**
Device -> Enjoyment	0.378	-	0.378***
Device -> Usefulness	0.469	-	0.469***
Device -> Purchase intention	-	0.397	0.397***
Enjoyment -> Purchase intention	0.115	-	0.115 n.s
Usefulness -> Purchase intention	0.752	-	0.752***

Note: n.s=non-significant at alpha 0.05

This study examined the effect of augmented reality on consumer purchases in e-commerce. The result of data processing indicates that virtual presence affects perceived enjoyment and usefulness. We assumed that the augmented reality used by e-commerce on this research site already has a good virtual quality (Slater & Steed, 2000). The high quality devices are able to produce perceived enjoyment. This is in accordance with the prior study, which states that the enjoyment level perceived by consumers is higher in the virtual stores than in physical stores (Lee & Chung, 2008). Likewise with the effect on usefulness to the consumer (van Noort et al., 2012). In addition, the result also gives us information that augmented reality has been accepted as a new technology by consumers. It supports Electronic Technology Acceptance Model (TAM) (Davis, 1989). The relationship between constructs in the model is indicated in the Figure 1.

The variable also has an indirect effect on purchase intention through perceived enjoyment and usefulness. The desire of consumers to pay for products is no longer because of the quality and characteristics of these products, but because of their experience using virtual reality applications (Li & Meshkova, 2013). It applies especially to female consumers. However, in this study, enjoyment is not being able to generate purchases. It can be caused by the virtuality level, whether it allows consumers to simulate the product in whole or only in part. In addition, it also depends on the type of consumers, whether they have hedonic or utilitarian values (Kim & Forsythe, 2007; Merle, Senecal, & St-Onge, 2012).

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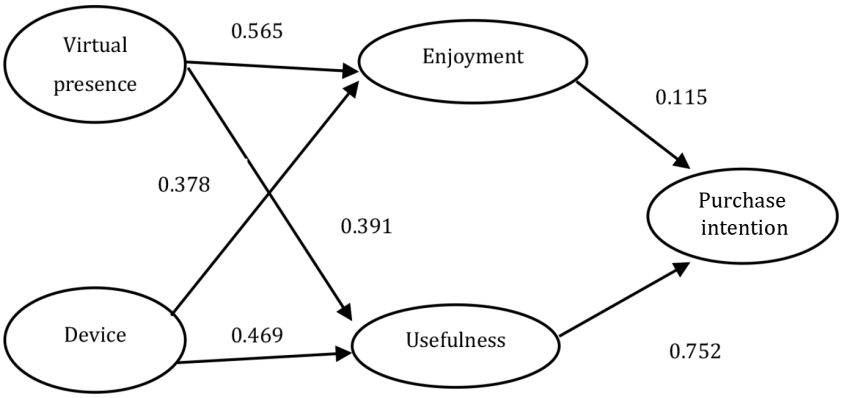
Figure 1. Structural result model of PLS-SEM



Note: n.s= non-significant at alpha 0.05

Consumer decisions with hedonic values will be more influenced by their experience of fun and playfulness when using virtual technologies. However, it is not the case with consumers with utilitarian values. Their decisions are based on rational consumption behavior. Consumers who have utilitarian values differ from those with hedonic values where the biggest motivation of consumers using augmented reality on e-commerce websites is to improve the quality of information they need in evaluating products. Also, the level of consumer confidence in virtual stores is still lower than websites (Kim & Forsythe, 2007). In addition, other factors such as cognitive involvement and self-congruity effects also influence consumer decisions to make a purchase.

The device also proved to significantly affect perceived enjoyment and usefulness. The device measures how easily the levels of augmented reality use in e-commerce, the types of media that can be used to access augmented reality, as well as the quality of text, sound, images, video, and animation. It is consistent with prior studies which state that ease of access to augmented reality through various media will enhance consumer enjoyment and knowledge of products through positive experience when using augmented reality (M. Yim, Cicchirillo, & Drumwright, 2012; M. Y. C. Yim et al., 2017). In this study, however, we did not specifically examine what factors of the media used that affected consumer enjoyment and usefulness. Usefulness has been indicated to affect purchase intention. The higher the consumer's perception of the usefulness of augmented reality in helping them get more quality information than traditional web based, the greater their chances of purchasing the product (He et al., 2018; Heijden, 2000; Huang & Hsu Liu, 2014; Poushneh & Vasquez-Parraga, 2017; M. Y. C. Yim et al., 2017). Conversely, enjoyment does not significantly affect purchase intention.

Augmented reality has given a new breakthrough in helping e-commerce solve the problem of how to bring the products online to buyers in real. Although e-commerce has provided consumers with the convenience to shop online, their biggest problem is to bring the product in real-time as if consumers were buying in stores directly. This will minimize dissatisfaction, return of products, and low ratings and reviews on e-commerce. Augmented reality has been proven to improve connectivity between products and consumers that support previous studies. As discussed above that the technology significantly affects consumer

perceptions of product enjoyment and usefulness. However, the influence of this technology on consumer buying behavior is still being debated.

CONCLUSION

This study confirms previous studies that analyzed the effect of augmented reality on purchase intention. The results of data analysis indicate that virtual presence significantly affects the enjoyment and usefulness directly and indirectly to purchase intention. Devices significantly affect the enjoyment and usefulness directly and usefulness proved to significantly affects purchase intention. Conversely, enjoyment does not significantly affect purchase intention. It can be affected by many factors, including types of consumers, cognitive involvement and self-congruence. In addition, the characteristics of consumers are also important to consider. Most of the respondents of this study are high school and university students, therefore, the interpretation of the results should be performed carefully. It is because students are more receptive and adaptable to new technologies, but it is not applied to adults and parents. In addition, in making a purchase decision, they may depend on their parents' decision. In addition, the results are still prevalent in all types of products that have adapted augmented reality technology to their websites. Each product may have different characteristics and the test results for each variable in this research model will possibly distinct.

REFERENCES

Ariely, D. (2000). Information Control in Buying Behvaiour. . *Journal of Consumer Research,* 27(2), 233-248

Azuma, R. T. A. (1997). Survey of Augmented Reality. *Presence: Teleoperators and Virtual Environments*. https://doi.org/10.1162/pres.1997.6.4.355

Chang, S. C., Sun, C. C., Pan, L. Y., & Wang, M. Y. (2015). An Extended TAM to Explore Behavioural Intention of Consumers to Use M-Commerce. *Journal of Information and Knowledge Management*, 14(2), 1–16.

Childers, T. L., Carr, C. L., Peck, J., & Carson, S. (2001). Hedonic and utilitarian motivations for online retail shopping behavior. *Journal of Retailing*. https://doi.org/10.1016/S0022-4359(01)00056-2

Davis, F. D. (1989). Preparation of Rutile TiO 2 Films by RF Magnetron Sputtering Related content Role of He Gas Mixture on the Growth of Anatase and Rutile TiO 2 Films in RF Magnetron Sputtering Kunio Okimura and Akira Shibata - Deposition of High-Quality TiO 2 Films by RF M. *Japanese Journal of Applied Physics Kunio Okimura et Al Jpn. J. Appl. Phys*, *34*(September). https://doi.org/10.2307/249008

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and Intrinsic Motivation to Use Computers in the Workplace. *Journal of Applied Social Psychology*, *22*(14), 1111–1132.

Desti, K., & Shanthi, R. (2015). The Impact of Augmented Reality on E-commerce. *Journal of Marketing and Consumer Research*, 64–73.

Golob, A. (2001). UC Irvine Recent Work Title Structural Equation Modeling for Travel Behavior Research. Retrieved from https://escholarship.org/content/qt56t8j1n6/qt56t8j1n6.pdf

http://journal.uinjkt.ac.id/index.php/esensi
DOI: https://doi.org/10.15408/ess.v9i2.9724

He, Z., Wu, L., & Li, X. (Robert). (2018). When art meets tech: The role of augmented reality in enhancing museum experiences and purchase intentions. *Tourism Management*, *68*, 127–139. https://doi.org/10.1016/j.tourman.2018.03.003

Heijden, H. Van Der. (2000). *E-Tam: a revision of the Technology Acceptance Model to explain website revisits* (No. 0029).

Hoyle, R. H. (1999). Structural Equation Modeling Analysis with Small Samples using Partial Lesst Squares. *Statistical Strategies for Small Sample Research*, (March), 34.

Huang, T.-L., & Hsu Liu, F. (2014). Formation of augmented-reality interactive technology's persuasive effects from the perspective of experiential value. *Internet Research*. https://doi.org/10.1108/IntR-07-2012-0133

Kim, J., & Forsythe, S. (2007). Adoption of Virtual Try-on Technology for Online Apparel Shopping. *Journal of Interactive Marketing*, *21*(3), 2–21. https://doi.org/10.1002/dir

Lee, K. C., & Chung, N. (2008). Empirical analysis of consumer reaction to the virtual reality shopping mall. *Computers in Human Behavior*, *24*(1), 88–104. https://doi.org/10.1016/j.chb.2007.01.018

Li, T., & Meshkova, Z. (2013). Examining the impact of rich media on consumer willingness to pay in online stores. *Electronic Commerce Research and Applications*, *12*(6), 449–461. https://doi.org/10.1016/j.elerap.2013.07.001

Lu, Y., & Smith, S. (2008). Augmented Reality E-Commerce: How the Technology Benefits People's Lives. *Human Computer Interaction*. https://doi.org/10.5772/6301

Ma, J. Y., & Choi, J. S. (2007). The virtuality and reality of Augmented reality. *Journal of Multimedia*, *2*(1), 32–37. https://doi.org/10.4304/jmm.2.1.32-37

Mathwick, C., Malhotra, N., & Rigdon, E. (2001). Experiential value: Conceptualization, measurement and application in the catalog and Internet shopping environment. *Journal of Retailing*, *77*(1), 39–56.

Merle, A., Senecal, S., & St-Onge, A. (2012). Whether and how virtual try-on influences consumer responses to an apparel web site. *International Journal of Electronic Commerce*, *16*(3), 41–64.

Morrison, D. G. (1979). Purchase intentions and purchase behavior. *Journal of marketing*, *43*(2), 65-74.

Nincarean, D., Alia, M. B., Halim, N. D. A., & Rahman, M. H. A. (2013). Mobile Augmented Reality: The Potential for Education. *Procedia - Social and Behavioral Sciences*, *103*, 657–664.

Poushneh, A., & Vasquez-Parraga, A. Z. (2017). Discernible impact of augmented reality on retail customer's experience, satisfaction and willingness to buy. *Journal of Retailing and Consumer Services*, *34*(October 2016), 229–234. https://doi.org/10.1016/j.jretconser.2016.10.005

Rapaccini, M., Porcelli, I., Espíndola, D. B., & Pereira, C. E. (2014). Evaluating the use of mobile collaborative augmented reality within field service networks: the case of Océ Italia – Canon Group. *Production and Manufacturing Research*, *2*(1), 738–755. https://doi.org/10.1080/21693277.2014.943430

Rese, A., Baier, D., Geyer-Schulz, A., & Schreiber, S. (2017). How augmented reality apps are accepted by consumers: A comparative analysis using scales and opinions. *Technological Forecasting and Social Change*, *124*, 306–319.

Slater, M., & Steed, A. (2000). A Virtual Presence Counter can't make changes. *Presence: Teleoperators and Virtual Environments*. https://doi.org/10.1162/105474600566925

Tussyadiah, I. P., Wang, D., Jung, T. H., & tom Dieck, M. C. (2018). Virtual reality, presence, and attitude change: Empirical evidence from tourism. *Tourism Management*, *66*, 140–154. https://doi.org/10.1016/j.tourman.2017.12.003

van Noort, G., Voorveld, H. A. M., & van Reijmersdal, E. A. (2012). Interactivity in Brand Web Sites: Cognitive, Affective, and Behavioral Responses Explained by Consumers' Online Flow Experience. *Journal of Interactive Marketing*, *26*(4), 223–234. https://doi.org/10.1016/j.intmar.2011.11.002

Yim, M., Cicchirillo, V., & Drumwright, M. (2012). The impact of stereoscopic three-dimensional (3-D) advertising. *Journal of Advertising*, *41*(2), 113–128.

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.

Zhu, W., Owen, C., Li, H., & Lee, J. (2004). Personalized in-store e-commerce with the promopad: an augmented reality shopping assistant. *Electronic Journal for E-commerce Tools and Applications*, *1*(3), 1-19

http://journal.uinjkt.ac.id/index.php/esensi
DOI: https://doi.org/10.15408/ess.v9i2.9724