

Discover Your Perfect Look: Virtual Makeup Try-On Revolutionizes Shopping Experience on Shopee!

Puput Ria Rachmiati

Universitas Indonesia, Depok, DKI Jakarta, Indonesia

Email: puput.ria@ui.ac.id

ABSTRACT

Competition in the e-commerce industry is becoming increasingly fierce with the emergence of various platforms offering similar products and services. In response to this competition, Shopee, one of the e-commerce platforms with the highest number of site visits, has adopted augmented reality (AR) technology in its BeautyCam and SkinCam features. These mobile applications, which support AR features, enable marketers and companies to provide detailed information to consumers about products and services, thereby influencing consumer perceptions. The purpose of this study was to evaluate behavioral intention towards the AR-based Shopee application feature using the Technology Acceptance Model (TAM). In this study, TAM was used to measure perceptions of the usefulness of information technology (Perceived Usefulness), ease of use (Perceived Ease of Use), and perceived enjoyment, which affect individual attitudes toward using information technology (Attitude Towards Using). This, in turn, determines the degree of a person's intention to use information technology (Behavioral Intention). The research employed a quantitative approach by distributing questionnaires to users of Shopee's BeautyCam and SkinCam features. Data analysis was conducted using Partial Least Squares - Structural Equation Modeling (PLS-SEM).

Keywords: augmented reality, beauty product, behavioral intention, consumer behavior, e-commerce, Shopee.

INTRODUCTION

Digitalization has swept the global economy over the past three decades. This led to a shift from a traditional management approach to one based on technology (Kraus et al., 2022; K.-H. Wang et al., 2021). The goal is to maintain their competitive position in the market and secure their survival or seize market share. Internet and information technology have made rapid progress in technology in business (Pizzo et al., 2022; Yuan et al., 2021).

Internet-enabled mobile devices give consumers online access to a wider market where they can shop at their convenience, anytime and from anywhere. Consumers can now reach a wide variety of brands and products both expensive and cheap. In addition, they can now quickly compare different products over long distances based on quality and price. Most retail businesses have implemented technology to maintain a competitive advantage and start online retail or electronic commerce (EC). E-commerce refers to businesses where technology and the Internet are used to complete business activities. It allows customers to exchange goods and services electronically though over long distances and at any time. E-commerce has increased rapidly over the past five years and has become an important part of the internet and technology, even projected to continue with higher development. The retail space has shown a transformation supported by increased digitalization and the explosion of online channels. Technology has revolutionized traditional retail practices and opened up new possibilities for retailers to offer dynamic experiences to consumers in the online region (Dwivedi et al., 2021; Mishra & Mukherjee, 2019; Pantano, 2014).

Retail businesses will adapt technology to a more advanced level, increasing reliance on standard internet technology to smart technologies such as the utilization of augmented reality in marketing communications. However, in the context of e-commerce, the main challenges retailers face are that customers can abandon online shopping carts and high return rates, so many customers refuse to shop online and complain of lack of direct contact with products, thus losing sensory shopping cues, such as touch and taste, which help in shopping decision making. The gap between physical and online experiences can be effectively bridged by introducing augmented reality (AR) technology that supports the senses in online shopping (Azuma, 1997; Dacko, 2017; Hilken et al., 2018; Jiang & Benbasat, 2004; Robertson et al., 2020; Sestino et al., 2022)

Retailers have realized the substantial benefits of AR during the COVID-19 pandemic. The pandemic has posed rigorous challenges for offline retailers as customers around the world worry about shopping in-store due to social distancing norms. Furthermore, retailers have invested in AR features in mobile shopping apps (apps)/web stores to facilitate customers' purchase decisions and drive sales. The ability of AR technology to dramatically transform businesses has been realized globally. However, existing research claims that managers still lack insight and need guidance to explore AR to its full potential. For example, reporting that strong consumer expectations and resistance have led to the failure of AR technologies in the early stages, such as Google Glass products. Therefore, marketers must understand the major barriers in adopting AR in e-commerce (CommerceNext & Exponea, 2020; Dwivedi et al., 2021; Gartner, 2017; Hilken et al., 2018, 2018; Hoyer et al., 2020; Papagiannis, 2020).

Previous research entitled "An Empirical Evaluation of Technology Acceptance Model for Artificial in E-Commerce", had limitations in exploring AR applications targeting female

consumers, especially in the context of beauty and cosmetics. Previous research has focused on demographic distribution of male respondents, ignoring the unique perspectives and preferences of female consumers. This underscores the need for research specifically designed to understand female users' attitudes, behaviors, and experiences regarding AR technologies, such as BeautyCam and SkinCam, in the e-commerce landscape (Wang, C. et al., 2023).

Indonesia is one of the countries with the largest population in the world with the use of digital technology that is growing rapidly. The increase in internet usage and adoption of other digital technologies in Indonesia, such as social media and e-commerce have increased in recent years. The increasing use of mobile devices and the increasing demand for digital content are also attracting attention, and can be an important strategy for marketers and companies in Indonesia.

During the pandemic, Indonesians have experienced an increase in online shopping. The Association of Indonesian E-commerce (idEA) shows an increase in online shopping between 25% to 30% in Indonesia, caused by the PPKM government policy that encourages people to switch to e-commerce.

E-commerce will continue to evolve at a rapid pace as the world becomes more digital and connected. Figure 1.2. shows that as many as 62.6% of active e-commerce users in Indonesia in 2023 buy products online. Global e-commerce sales have reached \$4.2 trillion by 2020, and will be expected to continue to rise. Amidst the ever-changing e-commerce landscape, it is crucial to stay ahead and understand the latest trends shaping the industry (Forbes, 2019).

Indonesia's e-commerce market penetration rate is expected to continue to increase by a total of 11.1% between 2024-2028. With a ten-year increase in a row, the indicator is expected to reach 46.5%, reaching a new peak in 2028. The increase will also be accompanied by the development of the number of e-commerce market users.

Shopee, which was launched in 2015, provides an easy, secure, and fast online shopping experience through strong payment and logistics support. In the first quarter of 2023, Shopee is the e-commerce with the highest number of site visits in Indonesia based on SimilarWeb data. From January to March of 2023, Shopee receives an average of 157.9 million visits per month, far surpassing its competitors. During the same period Tokopedia received 117.2 million monthly visits, Lazada 83.2 million visits, Blibli 25.4 million visits, and Bukalapak 18.1 million visits per month. Visits to the five e-commerce websites will increase in March 2023 due to the arrival of Ramadan as well as the lead-up to Eid al-Fitr. Based on wearesocial.com data for ranking applications with the most active users, Shopee became the first e-commerce to have the most active users in 4th place, and the most downloaded applications in 5th place, even the most shopping search keywords on Google with 6th place.

Constantly evolving technology can improve the relationship between customers and marketers. Reaching consumers through interactive methods has become one of the main goals

of a product. As a result, smartphones have turned into tools that can be used by products to initiate interaction with consumers. With mobile applications that support augmented reality features, marketers and companies can provide detailed information to consumers of products and services, and can also influence consumer perception.

(Kotler, M. et al., 2020) states that to enhance user experience and enhance actual digital marketing strategies, Augmented Reality (AR) is used as a marketing strategy. The focus of AR is to provide additional digital information into the real world so that it presents or displays virtual objects according to their environment. First, AR combines the real and virtual worlds with virtual products available to customers or people around them, allowing people to have experiences similar to real life without actually owning them. Second, virtual objects in AR are interactive and displayed in real-time via a webcam or smartphone camera. Third, virtual objects are registered in 3D and therefore have a fixed position in 3D, thus allowing interaction between virtual objects and the real world. Such unique characteristics of AR create online product presentations that resemble in-person product experiences (Dinillah et al., 2021).

According to the data, the AR market is expected to reach USD 50 billion by 2024, with 61% of consumers stating that they will shop more often than retailers using AR, and 71% of consumers feel increased confidence in purchasing decisions of a product if they use AR and will shop more often. Then, 66% of consumers in Japan want offline stores also to be able to offer AR, and 40% of consumers stated that they would be willing to pay more for products offered through AR. As a result of this demand, many brands are starting to build mobile Apps that use AR. For example, Maybelline New York allows women to see cosmetic products of their own choosing virtually. In addition, Converse, through its mobile app, allows people to try virtual variations of shoe models on their own feet without going to a store (Threekit, 2023).

Shopify is an integrated e-commerce platform that allows anyone to start, develop, manage and scale a business to build an online store. To enhance the interactive shopping experience, Shopify has acquired Primer, an AI-powered styling app, to help personalize and create a more immersive customer experience. Another big e-commerce player, Walmart also acquired Zeekit. The virtual fitting room technology uses AI to create realistic simulations of the appearance of clothes on various body types. Through the AI technology, customers can use the "Choose my model" feature for certain clothing items such as Levi's, Athletics Works, Terra & Sky and can choose around 50 different models with a height between 5'2" – 6'0" and sizes XS – XXXL that reflect the customer's physical posture.

The application of AR is also applied to IKEA Place is an application that allows users to when making IKEA simulation equipment placed in the user's home. This application helps

customers to place furniture based on the dimensions of their room with an accuracy rate of 98%.

Shopee is one of the e-commerce that often develops its technology. Based on data, this application has the fourth most active users and the fifth most downloads in Indonesia in 2020. Shopee strives to become the most popular e-commerce platform in Indonesia by making marketing efforts and paying attention to how easy it is to use its app. The customer's online shopping experience must be improved along with the development of technology, to meet customer needs. Shopee offers an attractive shopping experience for consumers through Shopee SkinCam and BeautyCam which are supported by advanced AR features, namely Virtual Try-On on certain cosmetic products such as L'Oreal, Maybelline, DAZZLE ME, and others (Wearesocial, 2023)

The BeautyCam and SkinCam features, which were launched in 2019, are marketing campaigns carried out by Shopee using AR so that consumers can do interactive makeup to reduce consumer doubts or confusion when shopping for cosmetic products online, which initially arose due to uncertainty in choosing product colors and types of products that suit facial conditions. However, because of the support of advanced, clear, detailed, and convincing AR features, consumers can be easier and more confident when shopping online.

The increasing online shopping behavior of customers along with the customer experience, has increased the demand for the addition of technology into a business. To assess whether TAM models are outdated or still worth using, a study was conducted by Ref., which examined 2,399 papers published in Web of Science from 2010 to 2020. Significant conclusions indicate that more research is being done on TAM and its applications, showing that the model can still be used, modified, and expanded across many applications and domains. With increasing research on recently developed applications such as augmented reality and e-commerce are at the top of the list of TAM applications (Al Shamsi et al., 2022; Al-Emran & Granić, 2021; AL-Nuaimi et al., 2023).

Although several previous studies have investigated the use of AR apps in the e-commerce landscape, they have focused on demographic distribution towards male respondents, thus ignoring the unique perspectives and preferences of female consumers. Previous research also had limitations in geographical data analysis, mainly focusing in the context of e-commerce in Pakistan, thereby ignoring potential insights and phenomena in different geographical contexts, to understand e-commerce behavior among Indonesian users. It emphasizes the need for tailored research to understand female users' attitudes, behaviors, and experiences about AR technologies in the context of body and beauty treatments, such as BeautyCam. Researchers will therefore further explore the use of AR apps specifically for female consumers, focusing on their preferences, needs, and perceptions of those apps.

In this study, AR technology testing is used as a communication and marketing medium based on the theory of Technology Acceptance Model (TAM). TAM is a theory of reasoned

action that argues that a person's reactions and perceptions of something, will determine that person's attitude and behavior. TAM consists of external variables namely Subjective Norm and Trust, Perceived Usefulness (PU), Perceived Ease of Use (PEU), Perceived Enjoyment (ENJ), Attitude toward Using (AU), Behavioral Intention (BIU), and Actual Use (AU). (Davis, 1989) Research will show that when consumers are at a more advanced level of being aware of and appreciating new technologies, they are more likely to seek new experiences from a variety of information sources that stimulate their senses. (Oyman et al., 2022)

This study aims to evaluate the influence of subjective norm (SN), trust (T), perceived usefulness (PU), perceived ease of use (PEU), and perceived enjoyment (ENJ) on attitude toward using (AU) and behavioral intention (BI) in using augmented reality (AR)-based Shopee application features using Technology Acceptance Model (TAM). This research will identify how user acceptance from the perspective of these various factors affects user attitudes and behavioral intentions. In addition, this research also provides benefits for academics as a reference to expand knowledge about consumer behavior in the context of AR technology, for service users to improve the experience of using AR features, and for business people to optimize AR features and follow the latest technology trends to maintain the relevance of their applications in the market.

RESEARCH METHODS

This research method was carried out using cross-sectional design and statistical methods of Structural Equation Modeling (SEM). This study aims to find out how the features of the Shopee application based on augmented reality (AR) affect user behavior. The object of this study is AR-based Shopee application users, focusing on variables such as trust, perceived ease of use, perceived usefulness, perceived enjoyment, attitude towards using, and behavioral intention to use. The source of this study's data was a questionnaire distributed online using Google Form. The questionnaire consists of four parts: an opening, a screening question, a core question, and a respondent profile. Filter questions are used to ensure that respondents meet the criteria that have been set for inclusion in the study. The population of this study is AR-based Shopee application users in Indonesia, with the following inclusion criteria: Indonesian nationality, domiciled in Indonesia, belonging to generation Y (born 1981 - 1995) or generation Z (born 1996 - 2010), and have tried the Shopee Augmented Reality-Based application in the last 3 months.

The sample of this study was not specifically mentioned, but was distributed online using Google Form. These research techniques and tools include the use of structured, logical, and four-part questionnaires, as well as SEM methods to examine relationships between complex latent variables. The analysis technique used in this study is SEM to test models that include several relationships between variables simultaneously. SEM allows researchers to test more

complex models than traditional regression analysis techniques and can identify causal relationships between measured variables.

RESULTS AND DISCUSSION

Hypothesis Testing

Researchers conduct hypothesis testing that aims to determine whether there is enough statistical evidence to support the research hypothesis that has been formulated. In this study, we used a statistical test method by utilizing T-value and P-value with a significant limit (α) used is 0.05. If the T-value obtained is greater than 1.645, then the relationship between these variables is considered positively significant. And vice versa, the relationship between variables will be considered negatively significant if the value of T is less than -1.645. Therefore, we can compare the value of T with the table T to find out whether the null hypothesis (H0) can be rejected or not. In addition, we can see the significance of the P-value, where the null hypothesis is rejected and the alternative hypothesis is accepted if the P-value is less than the significance level (α).

Table 1. Hypothesis Testing Results

Hypothesis	Hypothesis Statement	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Research Results
H1a	Subjective norm Influential positive to perceived Usefulness	0,294	0,292	0,080	3,682	0,000	Accepted
H1b	Subjective norm Influential positive to perceived ease of use	0,392	0,391	0,070	5,560	0,000	Accepted
H1c	Subjective norm Influential positive to perceived enjoyment	0,263	0,261	0,070	3,746	0,000	Accepted
H2a	Trust has a positive effect on perceived usefulness	0,309	0,311	0,084	3,691	0,000	Accepted
H2b	Trust Influential positive to Perceived ease of use	0,432	0,432	0,069	6,293	0,000	Accepted
H2c	Trust Influential positive to perceived enjoyment	0,328	0,327	0,080	4,092	0,000	Accepted
H3a	Perceived ease of use Influential positive to perceived usefulness	0,211	0,212	0,077	2,745	0,003	Accepted

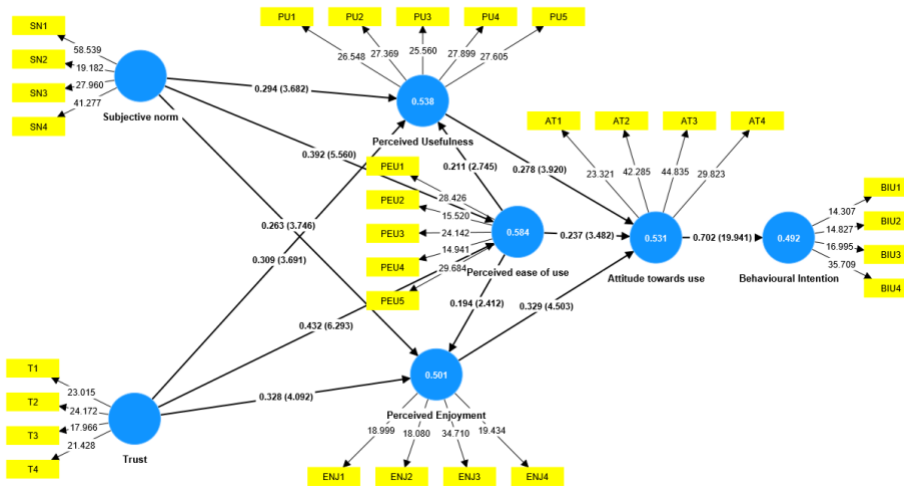
H3b	Perceived ease of use Influential positive to perceived enjoyment	0,194	0,195	0,080	2,412	0,008	Accepted
H3c	Perceived ease of use Influential positive to attitude towards use	0,237	0,237	0,068	3,482	0,000	Accepted

Table 2. Hypothesis Testing Results (Advanced)

H4	Perceived usefulness Influential positive to attitude towards use	0,278	0,282	0,071	3,920	0,000	Accepted
H5	Perceived enjoyment Influential positive to attitude towards use	0,329	0,324	0,073	4,503	0,000	Accepted
H6	Attitude towards use Influential positive to behavioural intention	0,702	0,704	0,035	19,941	0,000	Accepted

Source: SmartPLS Output (Author's Preparation, 2024)

Based on Figure 1, testing the direct effect hypothesis with t statistics shows that the causality of the measurement model, namely the relationship of indicators with measurement items other than valid, is also significant, as shown by statistical t values above 1.645. All direct effect hypotheses are significant ($p < 0.05$). Subjective norm and trust variables have a significant positive effect on increasing perceived ease of use, usefulness and enjoyment ($p < 0.05$). Furthermore, perceived ease of use, perceived usefulness and perceived enjoyment have a direct positive effect on attitude toward using. The attitude toward using is also significantly positive for the increase in behavior intention ($p < 0.05$).



Source: SmartPLS Output (Author's Preparation, 2024)

Figure 1. Statistical T Diagram of Hypothesis Testing

Based on the results of direct effect testing in Table 1, the influence between variables can be concluded as follows:

H1a: Subjective Norm Positively Affects Perceived Usefulness

The results of testing the first hypothesis (a) show that the relationship between subjective norm dimensions and perceived usefulness has a value with a path coefficient of 0.294 and statistical t of 3.682 > 1.645 or a p-value of < 0.05. The results are in line with previous research that underscores the role of subjective norms in reducing product uncertainty. In the context of Shopee, if consumers see that others around them are using AR features to get better product information, they will be more likely to find those features useful in the purchase decision-making process. From this value, it can be concluded that the (Sun, C. et al., 2022) subjective norm positively influences perceived usefulness in the use of augmented reality-based Shopee features in accordance with the first hypothesis or Hypothesis 1a Accepted.

H1b: Subjective Norm Influential Positive to Perceived Ease of Use

The results of testing the first hypothesis (b) show that the relationship between subjective norm dimensions and perceived ease of use with path coefficients 0.392 and statistical t 5.560 > 1.645 or p-value < 0.05. Therefore, it can be concluded that the subjective norm positively influences perceived ease of use in the use of augmented reality-based Shopee features in accordance with the first hypothesis (b) or HYPOTHESIS 1B ACCEPTED.

H1c: Subjective Norm Influential Positive to Perceived Enjoyment

The results of testing the first hypothesis (c) show that the relationship between subjective norm and perceived enjoyment dimensions has a path coefficient value of 0.263 and statistical t of 3.746 > 1.645 or a p-value of < 0.05. This suggests that a person's subjective norms and perception of pleasure influence their decision to purchase a good or service. In general, it has

been observed that a product or service used by an ideal person will be easily used by other products or services. From these results, it can be concluded that the subjective norm positively influences perceived enjoyment in the use of augmented reality-based Shopee features in accordance with the first hypothesis (c) or HYPOTHESIS 1C ACCEPTED.

H2a: Trust Influential Positive to Perceived Usefulness

The results of testing the second hypothesis (a) show that the relationship between the dimensions of trust and perceived usefulness dimensions has a path coefficient value of 0.309 and a statistical t of $3.691 > 1.645$ or a p -value of < 0.05 . From these results, it can be concluded that the Trust dimension positively influences Perceived Usefulness in the use of augmented reality-based Shopee features in accordance with the second hypothesis (a) or HYPOTHESIS 2A ACCEPTED.

H2b: Trust Influential Positive to Perceived Ease of Use

The results of testing the second hypothesis (b) show that the relationship between the trust dimension and perceived ease of use has a value with a path coefficient of 0.432 and a statistical t of $6.293 > 1.645$ or a p -value of < 0.05 . From these results, it can be concluded that the Trust dimension has a positive influence on Perceived Ease of Use in the use of augmented reality-based Shopee features in accordance with the second hypothesis (b) or HYPOTHESIS 2B ACCEPTED.

H2c: Trust Influential Positive to Perceived Enjoyment

The results of testing the second hypothesis (c) show that the relationship between the dimensions of trust and perceived enjoyment dimensions has a path coefficient value of 0.328 and a statistical t of $4.092 > 1.645$ or a p -value of < 0.05 . From these results, it can be concluded that the Trust dimension has a positive influence on Perceived Enjoyment in the use of augmented reality-based Shopee features in accordance with the second hypothesis (c) or HYPOTHESIS 2C ACCEPTED.

H3a: Perceived Ease of Use Influential positive to Perceived Usefulness

The results of testing the third hypothesis (a) show that the relationship between the dimensions of perceived ease of use and perceived usefulness has a path coefficient value of 0.211 and a statistical t of $2.745 > 1.645$ or a p -value of < 0.05 . From these results, it can be concluded that the Perceived Ease of Use dimension has a positive influence on Perceived Usefulness in the use of augmented reality-based Shopee features in accordance with the third hypothesis (a) or HYPOTHESIS 3A ACCEPTED.

H3b: Perceived Ease of Use Influential positive to Perceived Enjoyment

The results of testing the third hypothesis (b) show that the relationship between the dimensions of perceived ease of use and perceived enjoyment has a path coefficient value of 0.194 and a statistical t of $2.412 > 1.645$ or a p -value of < 0.05 . From these results, it can be concluded that the Perceived Ease of Use dimension has a positive influence on Perceived

Enjoyment in the use of augmented reality-based Shopee features in accordance with the third hypothesis (b) or HYPOTHESIS 3B ACCEPTED.

H3c: Perceived Ease of Use Influential Positive to Attitude Toward Using

The results of testing the third hypothesis (c) show that the relationship between the dimensions of perceived ease of use and attitude toward using has a path coefficient value of 0.237 and a statistical t of $3.482 > 1.645$ or a p -value of < 0.05 . From these results, it can be concluded that the Perceived Ease of Use dimension has a positive influence on attitudes toward Using in the **use of augmented reality-based Shopee features in accordance with the third hypothesis (c) or ACCEPTED 3C HYPOTHESIS.**

H4: Perceived Usefulness Influential Positive to Attitude Towards Using

The results of testing the fifth hypothesis show that the relationship between the dimensions of perceived usefulness and attitude toward use has a path coefficient value of 0.278 and a statistical t of $3.920 > 1.645$ or a p -value of < 0.05 . From these results, it can be concluded that the Perceived Usefulness dimension has a positive influence on Attitude Toward Using in the use of augmented reality-based Shopee features in accordance with the fourth hypothesis or HYPOTHESIS 4 ACCEPTED.

H5: Perceived Enjoyment Influential Positive to Attitude Towards Using

The results of testing the fifth hypothesis show that the relationship between the dimensions of perceived enjoyment and attitude toward use has a path coefficient value of 0.329 and a statistical t of $4.503 > 1.645$ or a p -value of < 0.05 . From these results, it can be concluded that the Perceived Enjoyment dimension has a positive influence on Attitude Toward Using in the use of augmented reality-based Shopee features in accordance with the fourth hypothesis or HYPOTHESIS 5 ACCEPTED.

H6: Attitude towards use Influential positive to behavioural intention to use

The results of testing the sixth hypothesis show that the relationship between the dimensions of attitude toward use and behavioural intention to use has a path coefficient value with a path coefficient of 0.702 and a statistical t of $19.941 > 1.645$ or a p -value of < 0.05 . From these results, it can be concluded that the Attitude Toward Using dimension has a positive influence on behavioral intention to use in the use of augmented reality-based Shopee features in accordance with the fourth hypothesis or HYPOTHESIS 6 ACCEPTED.

CONCLUSION

This study found that subjective norm and trust positively affect perceived usefulness, perceived ease of use, and perceived enjoyment in the use of augmented reality (AR)-based Shopee features. Perceived ease of use also positively affects perceived usefulness, perceived enjoyment, and attitude toward using, which in turn affects behavioral intention. This research reinforces the validity of the Technology Acceptance Model (TAM) in the context of AR

technology in e-commerce, suggesting that perceived usefulness and perceived ease of use remain important predictors, while perceived enjoyment also plays a significant role in the acceptance of AR technology. For practical implications, e-commerce companies like Shopee need to develop AR features that are interactive and fun, build user trust, and provide personalized shopping experiences. This study has limitations in terms of generalization of results and data collection methods, so follow-up research is recommended to cover a more diverse sample, use more objective data collection methods, and consider external factors. Qualitative methods such as case studies or in-depth interviews can provide richer insights into user perceptions and experiences.

BIBLIOGRAPHY

- Al Shamsi, J. H., Al-Emran, M., & Shaalan, K. (2022). Understanding key drivers affecting students' use of artificial intelligence-based voice assistants. *Education and Information Technologies*, 27(6), 8071–8091. <https://doi.org/10.1007/s10639-022-10947-3>
- Al-Emran, M., & Granić, A. (2021). Is It Still Valid or Outdated? A Bibliometric Analysis of the Technology Acceptance Model and Its Applications From 2010 to 2020. In *Technology Acceptance Models and Theories* (pp. 1–12). https://doi.org/10.1007/978-3-030-64987-6_1
- AL-Nuaimi, M. N., Al Sawafi, O. S., Malik, S. I., Al-Emran, M., & Selim, Y. F. (2023). Evaluating the actual use of learning management systems during the covid-19 pandemic: an integrated theoretical model. *Interactive Learning Environments*, 31(10), 6905–6930. <https://doi.org/10.1080/10494820.2022.2055577>
- Azuma, R. T. (1997). A Survey of Augmented Reality. *Teleoperators and Virtual Environments*, 6(4), 355–385.
- CommerceNext, & Exponea. (2020). *The big pivot: How traditional and digital-first retailers re-prioritized marketing investments in the wake of COVID-19*.
- Dacko, S. G. (2017). Enabling smart retail settings via mobile augmented reality shopping apps. *Technological Forecasting and Social Change*, 124, 243–256. <https://doi.org/10.1016/j.techfore.2016.09.032>
- Davis, F. D. F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3), 319–339. <https://doi.org/10.2307/249008>
- Dinillah, F. I., Gunawan, J., & Sinansari, P. (2021). Penggunaan Augmented Reality dan Perilaku Konsumen dalam Berbelanja Kosmetik Selama Pandemi Covid-19. *Jurnal Sains Dan Seni ITS*, 10(1). <https://doi.org/10.12962/j23373520.v10i1.60520>
- Dwivedi, Y. K., Ismagilova, E., Hughes, D. L., Carlson, J., Filieri, R., Jacobson, J., Jain, V., Karjaluoto, H., Kefi, H., Krishen, A. S., Kumar, V., Rahman, M. M., Raman, R., Rauschnabel, P. A., Rowley, J., Salo, J., Tran, G. A., & Wang, Y. (2021). Setting the future of digital and social

- media marketing research: Perspectives and research propositions. *International Journal of Information Management*, 59, 102168. <https://doi.org/10.1016/j.ijinfomgt.2020.102168>
- Forbes. (2019). *Augmented Reality: Eight AR Marketing Applications for Brands in 2019*. Forbes. <https://www.forbes.com/sites/theyec/2019/09/17/augmented-reality-eight-ar-marketing-applications-for-brands-in-2019/?sh=515ea9321b3b>
- Gartner. (2017). *Top trends in the Gartner hype cycle for emerging technologies*. www.gartner.com/smarterwithgartner/top-trends-in-the-gartner-hype-cycle-for-emerging-technologies-2017/.
- Hilken, T., Heller, J., Chylinski, M., Keeling, D. I., Mahr, D., & de Ruyter, K. (2018). Making omnichannel an augmented reality: the current and future state of the art. *Journal of Research in Interactive Marketing*, 12(4), 509–523. <https://doi.org/10.1108/JRIM-01-2018-0023>
- Hoyer, W. D., Kroschke, M., Schmitt, B., Kraume, K., & Shankar, V. (2020). Transforming the Customer Experience Through New Technologies. *Journal of Interactive Marketing*, 51, 57–71. <https://doi.org/10.1016/j.intmar.2020.04.001>
- Jiang, Z., & Benbasat, I. (2004). Virtual Product Experience: Effects of Visual and Functional Control of Products on Perceived Diagnosticity and Flow in Electronic Shopping. *Journal of Management Information Systems*, 21(3), 111–147. <https://doi.org/10.1080/07421222.2004.11045817>
- Kotler, M., Cao, T., Wang, S., & Qiao, C. (2020). *Marketing Strategy in the Digital Age: Applying Kotler's Strategies to Digital Marketing*. World Scientific Publishing.
- Kraus, S., Durst, S., Ferreira, J. J., Veiga, P., Kailer, N., & Weinmann, A. (2022). Digital Transformation in Business and Management Research: An Overview of the Current Status Quo. *International Journal of Information Management*, 63, 102466. <https://doi.org/10.1016/j.ijinfomgt.2021.102466>
- Mishra, N., & Mukherjee, S. (2019). Effect of Artificial Intelligence on Customer Relationship Management of Amazon in Bangalore. *International Journal of Management*, 10(4). <https://doi.org/10.34218/IJM.10.4.2019.016>
- Oyman, M., Bal, D., & Ozer, S. (2022). Extending the technology acceptance model to explain how perceived augmented reality affects consumers' perceptions. *Computers in Human Behavior*, 128, 107127. <https://doi.org/10.1016/j.chb.2021.107127>
- Pantano, E. (2014). Innovation drivers in retail industry. *International Journal of Information Management*, 34(3), 344–350. <https://doi.org/10.1016/j.ijinfomgt.2014.03.002>
- Papagiannis, E. (2020). *How AR Is Redefining Retail in the Pandemic*. Harvard Business Review. <https://hbr.org/2020/10/how-ar-is-redefining-retail-in-the-pandemic>

- Pizzo, A. D., Kunkel, T., Jones, G. J., Baker, B. J., & Funk, D. C. (2022). The Strategic Advantage of Mature-Stage Firms: Digitalization and The Diversification of Professional Sport Into Esports. *Journal of Business Research*, 139, 257–266. <https://doi.org/10.1016/j.jbusres.2021.09.057>
- Robertson, T. S., Hamilton, R., & Jap, S. D. (2020). Many (Un)happy Returns? The Changing Nature of Retail Product Returns and Future Research Directions. *Journal of Retailing*, 96(2), 172–177. <https://doi.org/10.1016/j.jretai.2020.04.001>
- Sestino, A., Guido, G., & Peluso, A. M. (2022). The Interplay of Consumer Innovativeness and Status Consumption Orientation When Buying NFT-Based Fashion Products. In *Non-Fungible Tokens (NFTs)* (pp. 63–75). Springer International Publishing. https://doi.org/10.1007/978-3-031-07203-1_6
- Sun, C., Fang, Y., Kong, M., Chen, X., & Liu, Y. (2022). Influence of augmented reality product display on consumers' product attitudes: A product uncertainty reduction perspective. *Journal of Retailing and Consumer Services*, 64, 102828. <https://doi.org/10.1016/j.jretconser.2021.102828>
- Threekit. (2023). *23 Augmented Reality Statistics You Should Know In 2023*. Threekit. <https://techreport.com/statistics/augmented-reality-statistics/>
- Wang, C., Ahmad, S. F., Bani Ahmad Ayassrah, A. Y. A., Awwad, E. M., Irshad, M., Ali, Y. A., Al-Razgan, M., Khan, Y., & Han, H. (2023). An Empirical Evaluation of Technology Acceptance Model For Artificial Intelligence in E-Commerce. *Heliyon*, 9(8), e18349. <https://doi.org/10.1016/j.heliyon.2023.e18349>
- Wang, K.-H., Umar, M., Akram, R., & Caglar, E. (2021). Is Technological Innovation Making World “Greener”? An Evidence From Changing Growth Story of China. *Technological Forecasting and Social Change*, 165, 120516. <https://doi.org/10.1016/j.techfore.2020.120516>
- Wearesocial. (2023). *Special Report Digital 2023 Indonesia*. Wearesocial. <https://wearesocial.com/id/blog/2023/01/digital-2023/>
- Yuan, S., Musibau, H. O., Genç, S. Y., Shaheen, R., Ameen, A., & Tan, Z. (2021). Digitalization of economy is the key factor behind fourth industrial revolution: How G7 countries are overcoming with the financing issues? *Technological Forecasting and Social Change*, 165, 120533. <https://doi.org/10.1016/j.techfore.2020.120533>

Copyright holder:

Puput Ria Rachmiati (2024)

First publication right:

Asian Journal of Engineering, Social and Health (AJESH)

This article is licensed under:

