



Buy or Bye? The Implementation of Augmented Reality to Enhance Consumer Willingness to Buy Cosmetics

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Article Information:

Keywords:

Augmented Reality;
E-commerce Shopee;
Online Shopping;
User willingness to Buy;
Product Cosmetic;

Article History:

Received : March 29, 2025
Revised : April 30, 2025
Accepted : May 2, 2025

Article Doi:

<http://doi.org/10.22441/jdm.v8i1.33031>

Abstract

This study explores how Augmented Reality (AR) features affect user experience and to what extent they contribute to users' purchase intention for cosmetic products on Shopee. As AR technology becomes increasingly integrated into online retail, key features such as personalization, interactivity, and detailed product information enhance user experience, which may increase consumer willingness to purchase. This study seeks to explore the impact of Augmented Reality (AR) technology, specifically through virtual try-on applications, on assisting customers in purchasing cosmetic products via the Shopee e-commerce platform. It aims to assess whether the use of AR can enhance the online shopping experience by helping users make more informed and confident decisions when choosing beauty products. Employing a quantitative research approach. In this study, the sample consist of 205 specifically gen-Z using SMARTPLS. The results of this study indicate that virtual try-on technology enhances the user experience, making it easier for customers to select cosmetic products when shopping online.

1. INTRODUCTION

Consumer shopping behaviour has changed in recent years. In today's era, consumers prefer online shopping rather than going directly to offline stores. Based on data from Statista, the e-commerce market in Indonesia is expected to experience a 51.03% growth in user numbers between 2024 and 2027 (Statista Research Department, 2025). For this reason, e-commerce platforms have been expanding in Indonesia during the past few years. According to Databoks, Momentum Works report, Shopee will be Southeast Asia's most prominent e commerce service provider in 2023 (Muhamad, 2024).

Shopee's gross merchandise value (GMV) reached US\$55.1 billion last year. With the growth of online shopping on e-commerce platforms, customers may no longer try and test things before making a purchase. The cosmetics business has shown strong growth and development in Indonesia. People, especially women, are becoming more aware of the importance of daily wearing makeup. According to a Databoks survey, 62% of participants prefer buying makeup online, according to Statista, Indonesia's cosmetics market generated US\$1.94 billion in revenue in 2024 (Pahlevi, 2022). Based on Indonesia Gen-Z Report 2024, With the advent of e-commerce websites and social commerce platforms, Indonesian online purchasing has significantly increased, especially since the COVID-19

pandemic. Notably, 72% of Gen Z respondents said they prefer to shop online at Shopee, with Tokopedia, a domestic e-commerce platform, coming in second at 12% and TikTok Shop at 11%. This pattern highlights how each platform caters to different preferences and needs. Gen Z women, who prioritize appearance and self-expression, are particularly likely to purchase clothing and cosmetics a variety of goods and services and meets specific demands. Because Gen Z women place a high value on appearance and self expression, they are more likely to buy clothes and cosmetics (Heriyanto et al., 2024).

Online shopping has become a modern lifestyle, especially on e-commerce platforms like Shopee. However, when it comes to cosmetic products, consumers are often faced with a unique challenge there is the inability to try the product before buying. In fact, in purchasing cosmetics, factors such as color, texture, and skin suitability are very crucial. As a result, many buyers feel hesitant, worried that the product ordered will not meet expectations, resulting in low sales conversion rates and high return rates. In physical stores, consumers can immediately try lipstick or foundation before buying. However, in the digital world, this experience can be integrated with the use of augmented reality. Several global cosmetic brands such as Sephora and L'Oréal have utilized AR through the virtual try-on feature, which has been proven to increase engagement and sales. Unfortunately, in large marketplaces like Shopee, this feature is still rarely adopted, even though its potential is very large.

Augmented reality (AR) technology has become crucial in enhancing the user experience on e-commerce platforms. As a major e-commerce platform in Southeast Asia, Shopee has incorporated augmented reality to enhance customer engagement and offer a more personalized shopping experience. By leveraging augmented reality, this technology allows users to virtually test clothing and cosmetics prior to buying, helping to boost purchase intention while minimizing cognitive dissonance. AR enables the blending of virtual elements with the real world. Customers can see how the product is interwoven with other environmental aspects, facilitating decision-making (Dacko, 2017). Customers can thus view how the product looks by using augmented reality. This allows consumers to explore available products through the use of AR. For instance, in the retail sector, customers can evaluate products before buying by utilizing the augmented reality-based virtual try-on (VTO) feature.

As digital technology evolves rapidly and leading companies like Amazon, Shopee, and IKEA continue integrating augmented reality (AR), understanding the role of personalization, interactivity, and user experience in shaping consumer purchase decisions becomes essential. This insight is essential, as a more customized and interactive shopping experience can strengthen customer loyalty while minimizing product returns, two major challenges in e-commerce (Poushneh & Vasquez-Parraga, 2017a).

While numerous studies have examined the impact of AR on user experience, there remains a research gap regarding how the combination of AR personalization and interactive features affects users' propensity to buy in various product contexts, particularly in Southeast Asia. Previous studies have predominantly concentrated on the American and European markets, emphasizing the necessity for a deeper investigation into AR applications in online shopping within emerging markets such as Shopee in Southeast Asia (Riar et al., 2023).

Additionally, there is limited research on how AR-enhanced user experiences influence long-term buying behavior, rather than merely shaping first impressions or initial purchase intentions (Guo & Zhang, 2024). The following key issues related to the use of AR in e-commerce, particularly on the Shopee platform, need to be explored further:

1. How does Shopee's use of AR impact the user experience?
2. How much impact does AR have on customers' propensity to purchase after experimenting with this feature?

Several AR-based studies on consumer behavior have been conducted using quantitative methods, where participants were shown screenshots of AR features in retail settings but did not actively use the AR application. Many of these studies focused on mobile apps rather than computer-based web environments. Additionally, previous research often concentrated on AR features that allowed participants to try on a limited selection of items, such as furniture or cosmetics. In contrast, the novelty from this research focus on e-commerce platforms, as customers increasingly prefer to shop online rather than through traditional web-based shopping. The author specifically investigates the use of AR in e-commerce for cosmetic products, with a particular emphasis on Generation Z as the study's target demographic. The goal of this research is to broaden the applicability of previous findings by examining AR's role in e-commerce environments. This study theoretically examines the impact of Augmented Reality (AR) on consumer perception of the vast range of online product choices, where consumers often face confusion and perceive high product similarity. The research explains how AR technology influences these variables during the purchasing

process by providing information, interactivity, and personalization. The findings highlight the importance of AR in boosting sales and profit margins. From the consumer's perspective, it helps simplify the selection of cosmetic products, which often come in a variety of shades, due to the wide range of available products in online stores. Understanding the key factors that can reduce consumer hesitation and foster a positive purchase intention can help convert potential lost sales into actual sales, ultimately improving the performance of e-commerce businesses. By achieving these objectives, the research will provide insights into how augmented reality can enhance e-commerce experiences. This study is anticipated to make contributions in two main aspects: Theoretical It will add to the existing literature on the use of AR in e-commerce, focusing on the variables that affect user experience and purchasing intentions. and also Practical It will offer valuable insights for Shopee's management, aimed at improving the quality of AR features to maximize user satisfaction and increase sales conversion rates.

2. LITERATURE REVIEW

Previous Research

Augmented Reality (AR) has attracted considerable interest in online shopping, mainly because of its ability to enhance the consumer experience by integrating digital elements with physical retail environments. Previous studies have explored various elements that contribute to the influence of AR on user experience and buying intentions. Verhagen et al. (2014) identified three principal mechanisms that affect consumer behavior in AR shopping contexts: local presence, product tangibility, and likability. These elements have been shown to positively enhance purchase intentions when compared to traditional online shopping methods. Similarly, Javornik (2016) highlighted the importance of interactivity, perceived enhancement, and flow as essential factors that enrich the overall AR shopping experience. Further study from Baek & Morimoto (2012) and Hilken et al. (2017) introduced concepts such as spatial presence, self-brand connection, and the immersive communication benefits of AR, indicating that its ability to evoke feelings of novelty, enjoyment, and utility significantly boosts consumer engagement and influences purchasing decisions. Yim et al. (2017) also found that AR increases user enjoyment and leads to more positive attitudes toward products, which ultimately elevates consumers' purchase willingness. Their research emphasized AR's ability to deliver more comprehensive product information, helping to alleviate uncertainties linked with online shopping. While much of the existing literature has concentrated on AR's effects in developed nations, Its impact on developing countries is still not well understood. Since the adoption of technology and consumer familiarity with AR can vary in these regions, More research is necessary to explore the potential of AR in improving user experience and purchasing intentions in these contexts.

Augmented Reality

Customers cannot touch, taste, or try things when they shop online (Jiang & Benbasat, 2007; Li et al., 2002; Whang et al., 2021). According to previous studies, consumers are more likely to be convinced and learn from direct product experiences, such as personal interactions and product trials, are more impactful than indirect experiences, like mediated exposure to product information (Hamilton & Thompson, 2007; Whang et al., 2021). Therefore, Online marketers must provide consumers with product details, features, and performance information before they make a purchase to develop satisfactory alternatives to direct product experiences (Klein, 2003). The technology used to present products has changed dramatically in the last 20 years. Therefore, online marketers increasingly use new technologies like videos, virtual product trials, and mobile augmented reality to provide richer product presentations (Park et al., 2012; Whang et al., 2021).

Besides in being interactive, augmented reality (AR) technology creates layers between virtual and real-world elements to merge the two worlds. Images, movies, and text are only a few of the types of information that the virtual layer adds to the physical world (Javornik, 2016a).

Online Product Presentation

according to Azuma (1997) the three primary characteristics of augmented reality are its three-dimensional projection, real-time application, and the ability to incorporate virtual aspects into the physical world. Additionally, AR can be used on screens, glasses, smartphones, tablets, and websites (Carmigniani et al., 2011; Javornik, 2016a). AR is a technology that provides various features, enhancing the online shopping experience and resulting in positive effects such as increased customer satisfaction (Carmigniani et al., 2011; Poushneh & Vasquez-Parraga, 2017a). First, as was previously said, AR can enhance real world surroundings that provide cognitive support by adding a virtual layer of different types of material (such as text, photos, or videos). Moreover, memory can be enhanced by

the cognitive support that comes from using AR technology (Fujimoto et al., 2012). For instance, consumers have a higher chance of recalling a brand when they buy a product that incorporates AR technology. (Mayer, 2014) asserts that AR can lessen cognitive load since it can see information from a range of digital media sources shown in the actual environment, facilitating information processing (Mirbabaie & Fromm, 2019). Additionally, research has shown that augmented reality (AR) can strengthen consumers' purchasing intention. This is because AR technology can, to some extent, encourage consumers to engage with objects through virtual rotation or trial customers who purchase online (Javornik, 2016a).

Customers who shop online, for instance, can employ augmented reality (AR) via apps on their desktops or smartphones. Another example is RayBan; this device enables users to select a favourite camera setting through their mobile devices (M. Y. C. Yim et al., 2017). AR can significantly boost sales by enhancing how people perceive technology and their interactions with it. One of the primary advantages of AR is that it enhances consumer engagement and satisfaction. By enabling consumers to view more detailed images and access in depth information, and interactive features—such as zooming in on or rotating products AR makes product sales more appealing and successful (Javornik, 2016a; Poushneh & Vasquez-Parraga, 2017a). Consumers using smartphones with augmented reality technology enhances engagement during business transactions (Blazquez Cano et al., 2017).

3. HYPOTESIS DEVELOPMENT

Information affect to user experience

With real-time and interactive capabilities, AR strives to provide the most detailed and engaging experience by allowing users to interact directly with items (Smink et al., 2020a). Users can visually examine various experiential aspects of a product with AR's multisensory and immersive experience (Klein, 2003; Li et al., 2001; M. Y. C. Yim & Park, 2019). Product selection uncertainty can be decreased, and user experience can be improved with information gleaned from online product displays. Another important factor is that online shoppers have more power to make educated choices, which increases their propensity to make a purchase (Chen & Yen, 2004; Hilken et al., 2017a; Overmars & Poels, 2015). According to this study, presenting a product online using Augmented Reality technology will yield more information than presenting it on application. Consequently, the theory:

H1. The information AR technology provides positively and significantly impacts the user experience.

Personalization effect on user experience

Personalization in Augmented Reality (AR) enhances user experience by tailoring content, visuals, and recommendations to individual preferences and behaviors. AR apps can create immersive and engaging experiences uniquely relevant to users through customized content, location based information, and behavior-driven recommendations. Provides customers with the ability to experience products in a way that feels relevant to them (Hilken et al., 2017a). For instance, it lets consumers see things on their face or body (makeup, sunglasses, clothes) or in their own space (furniture, TV) and customizes the experience for each customer. The interface also lets users personalize their experience by choosing from a range of virtual goods that show up in in real-time, either as part of the user's view or the actual environment. Positive, persuasive effects are anticipated from the perceived personalization that augmented reality produces. Personalized communication is seen as more relevant and draws more attention, which improves content processing and elaboration (De Keyzer et al., 2015; Maslowska et al., 2016; Tam & Ho, 2006). Additionally, marketers can benefit from the favorable emotions elicited by personalized cues. The interface enables users to personalize their experience by choosing from a selection of virtual items that are displayed in real-time within their field of view or environment. (Ahn & Bailenson, 2011; T. H. Baek et al., 2018). We anticipate the following outcomes of these studies:

H2. AR technology's personalization affects and impacts the user experience.

Interactivity affects user experience

Two viewpoints on interaction are presented by (M. Y. C. Yim et al., 2017), which add to a thorough comprehension of the function of interactivity in AR. This attribute highlights the ability of users to actively create their experiences rather than passively consume goods or services, including proactive information processing (Lim & Ayyagari, 2018). In order to frame the idea of interactivity that results from the technology being utilized, the significance of technological features must be highlighted. Therefore, the ability of technological systems to make it easier for people to interact with technology is what gives rise to interactivity. As a result, interactivity is achieved only when the user is willing to interact with the technology, as in AR or VR. one, a fundamental characteristic of AR is its ability to let users control the visual integration of virtual and real-world elements, making it a distinct

feature of AR technology. Two, key characteristics of AR technology is the user's capacity to manage how virtual and real environments merge visually. Three, crucial feature of AR is its ability to allow users to regulate the way virtual and physical worlds interact visually, setting it apart from other technologies (Lim & Ayyagari, 2018; McLean & Wilson, 2019).

According to this study, employing AR technology to present products online will lead to interactivity. Consequently, the hypothesis is:

H3. The interactivity of augmented reality technology positively impacts the user experience.

User Experience affect to user willingness to buy

The willingness of users to make a purchase is a multifaceted dependent variable shaped by multiple factors, such as perceived risk, user experience, and product attributes. Research indicates that that perceived risk significantly influences consumer willingness to purchase. For example, Hou et al. highlight that a higher degree of perceived risk is negatively correlated with willingness to buy, suggesting that as consumers perceive greater risk, their likelihood of purchasing decreases (Hou et al., 2023). Furthermore, UWB is influenced by AR-enhanced user experience. Similar to virtual imaging technology, AR provides consumers with a simulated experience that can encourage them to make a purchase. (T. L. Huang & Liu, 2014; Poushneh & Vasquez-Parraga, 2017a). Virtual objects and information delivered through AR can amplify users' pleasure and stimulate their mental imagery (Schlosser, 2003), which subsequently contributes to an increase in UWB (T. L. Huang & Liu, 2014; Kim & Forsythe, 2008). Consequently, the theory:

H4. An AR-enhanced user experience positively impacts the user's willingness to buy

Conceptual Framework

Based on the reviewed literature, key AR features information, personalization, and interactivity are consistently identified as critical contributors to an enhanced user experience in online shopping contexts ((Hilken et al., 2017b; Javornik, 2016b; Smink et al., 2020b). These features not only enhance consumers' ability to assess and interact with virtual products but also foster stronger emotional engagement and decision-making confidence (M. Y.-C. Yim et al., 2017). The literature also suggests that improved user experience derived from these AR features contributes to increased willingness to buy, as users perceive lower uncertainty and higher satisfaction (Poushneh & Vasquez-Parraga, 2017b), (T.-L. Huang & Hsu Liu, 2014) These insights directly inform the conceptual framework and hypotheses of this study, which posit that each AR feature individually impacts user experience (H1–H3), and that user experience subsequently affects the consumer's willingness to buy (H4).

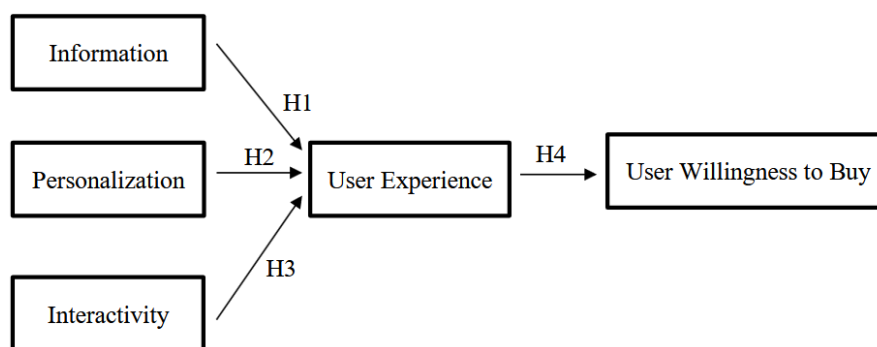


Figure 1. Conceptual Framework

4. RESEARCH METHODS

This study employs causal quantitative methods to explore the relationships between variables, specifically looking for cause and effect connections in order to test established hypotheses. The main data used in this study was collected directly from consumers who purchased cosmetic products on Shopee, utilizing online questionnaires. The study examined five variables: interactivity, personalization, information, user experience, and user willingness to buy, all of which were derived from existing literature.

Data was examined using the Partial Least Squares Structural Equation Modeling (PLS-SEM) method. A five-point Likert scale was employed to assess all constructs, ranging from 1 (strongly disagree) to 5 (strongly agree). The analysis covered both measurement validation and structural equation modeling. SMARTPLS software was used

to analyze the data obtained from the Google Forms survey. (<https://forms.gle/4xwQHVUXAfrw4pUy9>). The SEM model components used are the outer model and the inner model.

Evaluation of the Measurement Model (Outer Model)

In the first stage, the outer model evaluation is conducted to ensure the validity and reliability of the constructs used. Convergent validity is assessed by examining the loading factor of each indicator, which should be greater than 0.70, and the Average Variance Extracted (AVE), which must exceed 0.50. Additionally, construct reliability is evaluated using Composite Reliability and Cronbach's Alpha, both of which should be above 0.70. The test results indicate that all indicators meet these criteria, demonstrating that the measurement instruments used are both valid and reliable.

Furthermore, to confirm that each construct is distinctly different from the others, discriminant validity is tested using the Heterotrait-Monotrait Ratio (HTMT). The HTMT values must be below 0.90. The results show that all constructs meet this requirement, indicating no overlap between them.

(Hair et al., 2011; Sarstedt et al., 2021).

Structural Model Evaluation (Inner Model)

The second stage involves evaluating the inner model, which aims to test the relationships between latent constructs. First, the R-Square (R^2) value is calculated to determine the extent to which independent variables explain the dependent variables. In this study, the R^2 value for User Experience is 0.649, indicating a strong level of influence, while the R^2 value for User Willingness to Buy is 0.548, suggesting a moderate level of influence.

Next, the significance of the relationships between variables is tested using a bootstrapping analysis, which provides T-statistics and P-values. The results show that all paths between constructs have T-values greater than 1.96 and P-values less than 0.05, indicating that all proposed hypotheses are supported. To ensure there is no multicollinearity among the predictor constructs, the Variance Inflation Factor (VIF) was also examined. The VIF values across all paths are below 5, indicating the absence of multicollinearity issues within the model (Hair et al., 2011; Sarstedt et al., 2021).

Hair et al. (2010) suggest that the optimal sample size for Structural Equation Modeling (SEM) analysis should range from 5 to 10 times the number of analyzed items or parameters. Since this study involves 23 indicators and the measurement can be seen in **Appendix A**. The recommended sample size should range from 115 to 230 respondents. The study employs a purposive sampling method, collecting data from augmented reality (AR) users of the most relevant applications.

5. RESULTS AND DISCUSSION

Result

The analysis results are presented in this section, followed by a discussion of the findings. Initially, 256 responses were collected; however, after data validation, only 205 were considered valid. The findings present respondent demographics, a review of the measurement model, an analysis of the structural model, and a discussion of their significance. The characteristic of respondents and customer behavior can be seen in **Appendix B**.

This research aims to explore how augmented reality (AR) in retail environment through features such as information access, personalization, and interactivity affects users' willingness to make purchases based on their user experience. The initial step before testing the hypothesis using Smart Partial Least Square (PLS) involves evaluating the measurement model (outer model). This evaluation determines the relationships between latent variables and manifest variables. The assessment includes testing for convergent validity, discriminant validity, and reliability. Convergent validity of the measurement model, which utilizes reflexive indicators, is assessed by examining the correlation between the item/indicator scores and the construct scores.

Table 2. Loading Factor Result

Indicator	Information	Interactivity	Personalization	UWB (User Willingness to Buy)	User Experience
INF1	0.849	-	-	-	-
INF2	0.847	-	-	-	-
INF3	0.864	-	-	-	-
INF4	0.883	-	-	-	-
INF5	0.860	-	-	-	-
INT1	-	0.842	-	-	-
INT2	-	0.837	-	-	-

Indicator	Information	Interactivity	Personalization	UWB (User Willingness to Buy)	User Experience
INT3	-	0.885	-	-	-
INT4	-	0.809	-	-	-
INT5	-	0.864	-	-	-
PZ1	-	-	0.833	-	-
PZ2	-	-	0.865	-	-
PZ3	-	-	0.853	-	-
PZ4	-	-	0.842	-	-
PZ5	-	-	0.883	-	-
UWB1	-	-	-	0.773	-
UWB2	-	-	-	0.835	-
UWB3	-	-	-	0.825	-
UWB4	-	-	-	0.856	-
UX1	-	-	-	-	0.795
UX2	-	-	-	-	0.815
UX3	-	-	-	-	0.842
UX4	-	-	-	-	0.774

The results processed through the Smart PLS program indicate that the Loading Factor values in Table 3 are <0.70, verifying the validity of all indicators.

The average variance extracted (AVE) and composite reliability values confirm that the validity and reliability criteria are met. A construct is deemed to have strong discriminant validity if the square root of its average variance extracted (AVE) value exceeds 0.5. On the other hand, if the composite reliability of an indicator measuring the construct is above 0.60, or if reliability is determined using Cronbach's alpha, a construct is considered reliable when its Cronbach's alpha value surpasses 0.7.

Table 3. Construct Reliability and Validity

Indicator	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
Information	0.913	0.913	0.935	0.741
Interactivity	0.902	0.919	0.927	0.719
Personalization	0.908	0.910	0.932	0.731
User Willingness to Buy (UWB)	0.841	0.845	0.893	0.677
User Experience	0.821	0.824	0.882	0.651

1. The information, personalization, and interaction variables, as well as user readiness to purchase, have an AVE value > 0.5, according to table 4 's processing findings using the Smart PLS Program. As a result, every variable has strong discriminant validity.
2. The information, personalization, and interaction variables, as well as user readiness to purchase, have a composite reliability value of > 0.6, according to the outcomes of processing with the Smart PLS Program, which are shown in table 4. All of the constructs are therefore highly reliable.

Once all testing phases are conducted, the subsequent step in this research is to assess the structural model (inner model) based on the measurement results. The study conducted two measurements in the initial research stage: assessing the impact magnitude using R Square and testing the hypothesis with a 5% (0.05) alpha value. The outcomes of the bootstrapping test from the PLS analysis are presented as follows:

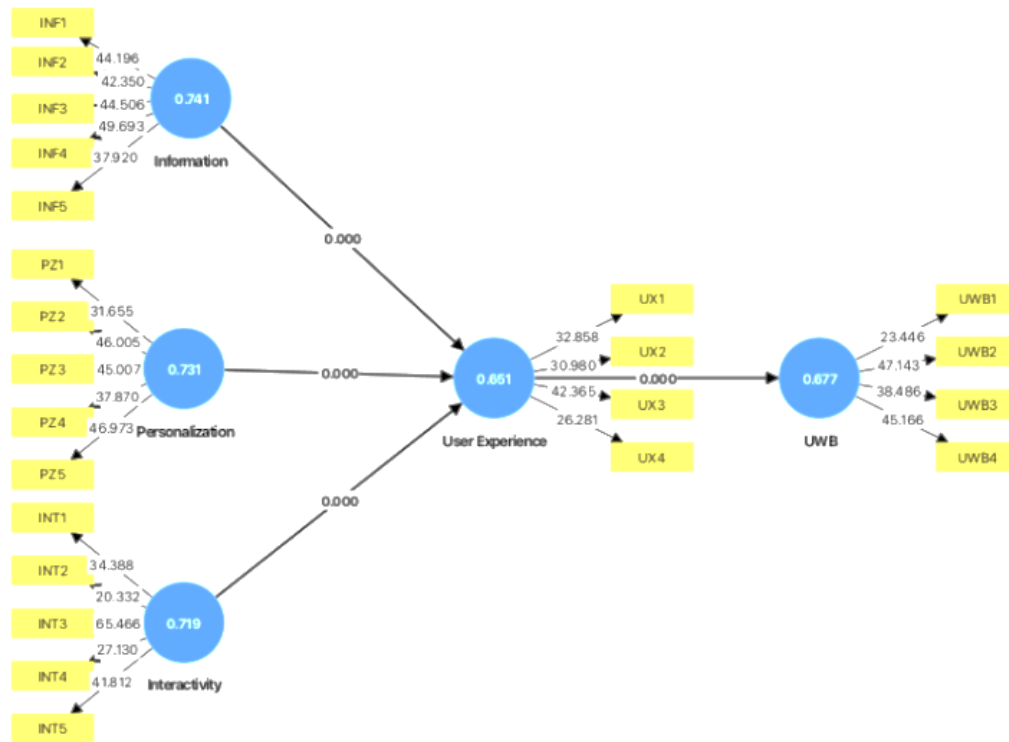


Figure 2. Bootstrapping model result

The inner model or structural model is tested to identify construct relationships, assess significance levels, and evaluate the R-square value of the research model. The evaluation of the structural model was based on the R-square of the dependent construct, as well as the t-test and the significance of the structural path parameter coefficients. When assessing the model using the Smart PLS Program, the R-square value for each dependent latent variable should be analyzed first.

Table 4. R-Square Test Results

Indicator	R-Square	R-Square Adjusted	Result
User Willingness to Buy (UWB)	0.548	0.546	Acceptable
User Experience	0.649	0.644	Acceptable

The R-square value for the user's willingness to buy is 0.548, meaning that the virtual try-on variable explains 54.8% of the user experience, while the remaining 45.2% is influenced by other factors. This finding is based on the results obtained from processing with the Smart PLS Program, as shown in Table 5. The R square value for the user experience variable is 0.649, indicating that user willingness to buy explains 64.9% of the user experience, while the remaining 35.1% is influenced by other factors. In this study, the relationship between latent constructs was analyzed after assessing the inner model. Hypothesis testing was conducted by evaluating T-Statistics and P Values. A hypothesis is considered accepted if the P-Values are below 0.05 and the T-Statistical value exceeds 1.96.

Table 5 Path Coefficients Test Result (Direct Effect)

Indicator	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Result
Information -> UX	0.491	0.492	0.041	11.885	0.000	supported
Interactivity -> UX	0.412	0.413	0.042	9.907	0.000	supported
Personalization -> UX	0.414	0.406	0.040	10.232	0.000	supported
UX -> UWB	0.740	0.743	0.036	20.624	0.000	supported

According to the results processed using the Smart PLS Program in Table 5, information, interactivity, and personalization all have an influence on users' willingness to purchase cosmetics through the Shopee application through user experience.

Discussion

The hypothesis testing outcomes presented in Table 5 offer solid empirical validation for the conceptual framework proposed in this study. Each result is directly aligned with prior theoretical work. There are:

Information → User Experience ($\beta = 0.491$; $T = 11.885$; $p = 0.000$)

The analysis reveals that the information aspect of AR significantly enhances user experience. This finding is consistent with earlier research by Smink et al. (2020) and Yim & Park (2019), which emphasized the importance of real-time, detailed product information in empowering consumers and improving comprehension during the shopping process. It also supports Mayer's (2014) cognitive support theory, which highlights how rich and diverse information formats in AR can alleviate cognitive overload. Thus, these findings confirm H1, indicating that informative AR features play a crucial role in improving user satisfaction. According to the test results, information significantly and favorably affects the Shopee application's user experience. With AR multisensory and immersive experiences, users can visually examine different aspects of a product's experience. The findings of this study align with previous research, which also concluded that information has a positive and significant impact on user experience (Klein, 2003; Li et al., 2001; M. Y. C. Yim & Park, 2019). This implies that the user experience will be better and the user will be more inclined to buy if the information is given in a more relevant manner. In the digital era, the user experience is greatly influenced by the quality and accessibility of information, particularly when utilizing emerging technologies like Augmented Reality (AR) in e-commerce platforms like Shopee. Users' trust, interaction, and purchasing decisions can all be influenced by accurate, understandable, and pertinent information. Thus, the virtual try-on element of AR has a significant impact on users' decisions to purchase cosmetics online.

Personalization → User Experience ($\beta = 0.414$; $T = 10.232$; $p = 0.000$)

The positive and significant effect of personalization on user experience provides strong support for H2. This result aligns with theories on customized communication, as proposed by De Keyzer et al. (2015) and Baek & Morimoto (2012), which argue that tailored content enhances user involvement and emotional resonance. The ability of AR to simulate personalized product usage such as virtual makeup try-ons fosters a more engaging and personally meaningful interaction, consistent with the framework outlined by Hilken et al. (2017). The test explain that the personalization was positively impact in customer experience. In the realm of e-commerce, particularly within the cosmetics sector, the Augmented Reality (AR) feature with personalization is an important factor that influences the user experience. Personalization in AR allows users to try products virtually by adjusting individual preferences, such as skin color, face type, or lighting conditions. This feature provides a more realistic, interactive, and relevant experience, thereby increasing user satisfaction and confidence in the purchasing process. Users feel more involved when AR offers recommendations that match their personal characteristics. When presented with more precise product simulations, users feel more assured in making purchasing decisions. The shopping experience becomes more satisfying and aligned with individual preferences. When users get a personalized experience, they are more likely to make a transaction. The higher the level of personalization in the AR feature, the more positive the user experience in shopping for cosmetics online. then this is relevant and in line with previous theories stating that Personalization enhances persuasive effectiveness by catering to the specific needs and interests of individual consumers (Chu & Kim, 2011; De Keyzer et al., 2015; Tam & Ho, 2006)

Interactivity → User Experience ($\beta = 0.412$; $T = 9.907$; $p = 0.000$)

The data also confirm H3, showing that interactivity within AR environments significantly improves the user experience. This is in line with findings from Yim et al. (2017) and Lim & Ayyagari (2018), who describe interactivity as a key element of user empowerment and active engagement. By allowing consumers to manipulate virtual products in real time, AR creates a participatory shopping experience that increases user satisfaction and involvement. The test results showed that interactivity positively and significantly influences the user experience of cosmetics on the Shopee application. These findings are consistent with previous research, highlighting that this feature allows users to actively shape their experiences rather than merely passively consuming products or services, including engaging in proactive information processing (Lim & Ayyagari, 2018). Interactivity is a crucial component of AR technology, enhancing the user experience, particularly in online cosmetic shopping. In e-commerce applications such as Shopee, interactive AR features allow users to try products virtually, change colors or textures, and interact with digital elements in real-time. Users are more interested and engaged when they can interact directly with products virtually, for example by changing lipstick colors or trying different types of foundations in real-time.

Interactivity in AR directly contributes to increasing user engagement, satisfaction, and trust in technology. A higher level of interactivity increases the likelihood that users will feel comfortable and enjoy their shopping experience. Thus, it can be concluded that the higher the level of interactivity in the AR feature, the more positive the user experience in online cosmetic shopping. Therefore, the development of AR features in applications such as Shopee must continue to improve the interactivity aspect to be more responsive, realistic, and attractive to users.

User Experience \rightarrow User Willingness to Buy ($\beta = 0.740$; $T = 20.624$; $p = 0.000$)

This final result, which demonstrates the strongest relationship in the model, confirms H4. A positive user experience significantly drives consumers' willingness to make a purchase. This supports the theoretical perspectives of Poushneh & Vasquez-Parraga (2017) and Huang & Liu (2014), who assert that immersive AR interactions reduce perceived risks, foster trust, and elevate the overall enjoyment of online shopping—factors that are key to encouraging purchase intentions. The above test indicates that user experience influences the willingness to purchase. By allowing users to try products virtually before buying, AR can significantly improve user experience. A positive user experience in using AR features plays an important role in building trust, increasing engagement, and ultimately influencing willingness to buy. Users who are satisfied with the AR experience tend to trust the e-commerce platform more and are more likely to make repeat purchases in the future. This aligns with previous research suggesting that AR has the ability to provide consumers a simulated experience to persuade them to purchase items, much as virtual image technology (T. L. Huang & Liu, 2014; Poushneh & Vasquez-Parraga, 2017a)

6. CONCLUSION AND LIMITATION

The conclusion of the test results shows that the variables of information, personalization, interactivity affect the AR user experience in e-commerce shopee especially for purchasing cosmetic products, additionally, the test results in this study indicate that a more positive experience among AR users leads to higher outcomes., the more it affects user willingness to buy. The positive impacts of implementing AR in cosmetic e-commerce are very diverse. First, AR increases consumer confidence by allowing them to try products virtually, reducing uncertainty before purchasing. Second, this feature helps reduce the risk of online purchases by presenting more accurate simulations, thereby reducing the rate of product returns. Third, the shopping experience becomes more interesting and interactive, increasing user engagement and satisfaction. Fourth, AR features directly contribute to increased sales conversions, because users who have positive experiences are more likely to complete purchases. Finally, this innovation can also build customer loyalty, making them more likely to return to shop on platforms that offer advanced technology and satisfying experiences.

The theoretical implication from this research. First, This study contributes to the growing body of AR research by investigating how key features such as information, personalization, and interactivity within AR applications influence user experience and ultimately affect purchase intention. Unlike much of the existing literature, which focuses on Western consumer behavior, this research addresses a notable gap by exploring the experiences of Gen Z users in Southeast Asia, with a specific emphasis on Indonesia and the Shopee e-commerce platform. Second, validation of AR constructs in Emerging Markets. By empirically validating the impact of AR on consumer behavior using PLS-SEM, the study supports the generalizability of constructs like spatial presence, self-brand connection, and immersive interactivity in developing country contexts, which are often underrepresented in tech adoption literature. Besides the theoretical implication, there is the practical implication. First, the results suggest that e-commerce platforms such as shopee can greatly benefit from enhancing AR functionalities particularly those that focus on interactivity, customization, and comprehensive product information. These improvements are likely to increase user satisfaction and trust, which in turn can lead to higher purchase conversion rates. Second, retailers and platform operators should provide clear guides/tutorials to help consumers maximize the AR feature experience especially for first-time users or those unfamiliar with VTO (virtual try-on) features.

Based on these conclusions, it is recommended for business actors in the cosmetics sector to apply virtual try-on technology to every cosmetic product they sell and provide a virtual try-on usage guide to consumers, to make it easier for consumers who want to buy products online. This study has certain limitations, primarily focusing only on the relationship between independent variables and dependent variables. The suggestion for future research measured user willingness to buy at a specific point in time. Future research could use a longitudinal approach to examine how AR influences long-term purchasing patterns, brand loyalty, or repeat purchase behavior over time. Research can also focus on specific AR design elements such as interface usability, realism, or response time to understand which technical aspects most significantly affect the user experience and decision-making process.

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Appendix A Measurement

No	Variable	Variable Definition	Indicator	Question Items	Source
1	Information Features (INF)	AR strives to provide a highly immersive and informative experience by enabling direct interaction with objects through real-time and interactive features (Smink et al., 2020a)	1. INF1, 2. INF2, 3. INF3, 4. INF4, 5. INF5	1. Providing complete and detailed information 2. Providing information that was helpful in decision making 3. Making possible to compare products 4. Getting information is very fast 5. Finding the answers about the colour and type of products	Smink et al. (2020)
2	Personalization Features (PZ)	The effectiveness of persuasion is strengthened through personalization, as it directly addresses the distinct preferences and requirements of consumers (Chu & Kim, 2011; De Keyser et al., 2015; Tam & Ho, 2006)	1. PZ1, 2. PZ2, 3. PZ3, 4. PZ4, 5. PZ5	1. Was customized for my circumstances 2. It seemed like an intimate encounter. 3. Fulfilled my requirements 4. Had personal significance for me 5. This meets my requirements.	T. Baek & Morimoto (2012); Smink et al. (2020); Srinivasan et al. (2002)
3	Interactivity Features (INT)	Users can visually navigate and interact with a seamlessly integrated virtual environment. (Lim & Ayyagari, 2018; McLean & Wilson, 2019)	1. INT1, 2. INT2, 3. INT3, 4. INT4, 5. INT5	1. Command over my navigation 2. I saw what I anticipated. 3. The capacity to promptly and effectively address my particular needs 4. Capable of making my own decisions. 5. Capable of interacting with the surroundings with ease	Ronaghi & Ronaghi (2022)
4	User Experience (UX)	User experience is the comprehensive integration of users' emotions, perceptions, and reactions throughout their interaction with a product, system, or service supported by technologies such as AR and VR. (Mayer, 2014; Shin, 2019)	1. UX1, 2. UX2, 3. UX3, 4. UX4	1. I am satisfied with my experience 2. This experience is exactly what I wanted 3. This experience is as good as I thought 4. It is just like the real experience of trying on products	Romano et al. (2021); Wedel et al. (2020)
5	User Willingness To Buy (UWB)	Augmented reality (AR) can offer consumers a simulated experience to persuade them to purchase items, much as virtual image technology (T. L. Huang & Liu, 2014; Poushneh & Vasquez-Parraga, 2017a)	1. UWB1, 2. UWB2, 3. UWB3, 4. UWB4	1. Buying with more confidence 2. Making decisions more easily Able to shop online 3. Reducing the cost of searching 4. Online shopping makes shopping and life easier	Smink et al. (2020)

Appendix B Characteristics of Respondents and Customer Behavior

Characteristic	Frequency	Percentage (%)
Age		
11-15 years old	11	4.3%
16-20 years old	107	42.1%
21-27 years old	136	53.5%
Location		
Sumatra Utara	31	12.8%
Sumatra Selatan	83	34.2%
Lampung	27	11.1%
DKI Jakarta	13	13%
Jawa Barat	6	2.5%
Jawa Tengah	9	3.7%
Jawa Timur	7	2.9%
Sulawesi Selatan	5	2.1%
Education		
Elementary School	4	1.6%
Junior High School	29	11.8%
Senior High School	111	45.1%
Diploma/Bachelor	84	34.1%
Master	16	6.5%
Job		
Students	153	62.2%
Private Company Employee	18	7.3%
Civil Servant	48	19.5%
Entrepreneur	16	6.5%
Freelancer	11	4.5%
Monthly Income		
≤ Rp. 2.000.000	137	56.4%

Rp 2.000.000 - Rp 5.000.000	73	30%
Rp 5.000.000 - Rp 10.000.000	29	11.9%
Rp 10.000.000 - Rp 30.000.000	3	1.3%
≥ Rp 30.000.000	-	-