

# The Role of Virtual Try-On Augmented Reality of Cosmetic Products on Purchase Intention Mediated by Brand Trust

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## ARTICLE INFO



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### Keywords:

Augmented Reality, Purchase Intention, Brand Trust

### DOI:

<https://doi.org/10.33096/jmb.v11i2.797>

## ABSTRACT

This study investigates the impact of Augmented Reality (AR) features, particularly Virtual Try-On (VTO), on purchase intention through brand trust in the context of cosmetic products in Indonesia. The research uses a quantitative approach with a sample of 274 respondents from various cities and provinces in Indonesia. Data analysis was conducted using SmartPLS 3 software, which shows a positive influence of AR on purchase intention mediated by brand trust. The findings indicate that AR Content Quality and AR Service Quality positively affect purchase intention through brand trust. This study provides valuable insights for the cosmetic industry in Indonesia, emphasizing the importance of AR features in enhancing consumer purchase intentions and brand trust. The research highlights that the effective implementation of AR can be a successful strategy for cosmetic companies to increase consumer engagement and loyalty, and drive market growth through technological innovation that aligns with current consumer needs and preferences.

## ABSTRAK

Penelitian ini menyelidiki dampak fitur Augmented Reality (AR), terutama Virtual Try-On (VTO), terhadap niat beli melalui kepercayaan merek dalam konteks produk kosmetik di Indonesia. Metode penelitian kuantitatif digunakan dengan sampel 274 responden dari berbagai kota dan provinsi di Indonesia. Analisis data dilakukan menggunakan perangkat lunak SmartPLS 3, yang menunjukkan adanya pengaruh positif AR terhadap niat beli yang dimediasi oleh kepercayaan merek. Hasil penelitian menunjukkan bahwa Kualitas Konten AR dan Kualitas Layanan AR secara positif mempengaruhi niat beli melalui kepercayaan merek. Temuan ini memberikan wawasan berharga bagi industri kosmetik di Indonesia, menekankan pentingnya fitur AR dalam meningkatkan niat beli konsumen dan kepercayaan merek. Penelitian ini menyoroti bahwa implementasi AR yang baik dapat menjadi strategi efektif untuk perusahaan kosmetik dalam meningkatkan keterlibatan dan loyalitas konsumen, serta mendorong pertumbuhan pasar melalui inovasi teknologi yang relevan dengan kebutuhan dan preferensi konsumen saat ini.

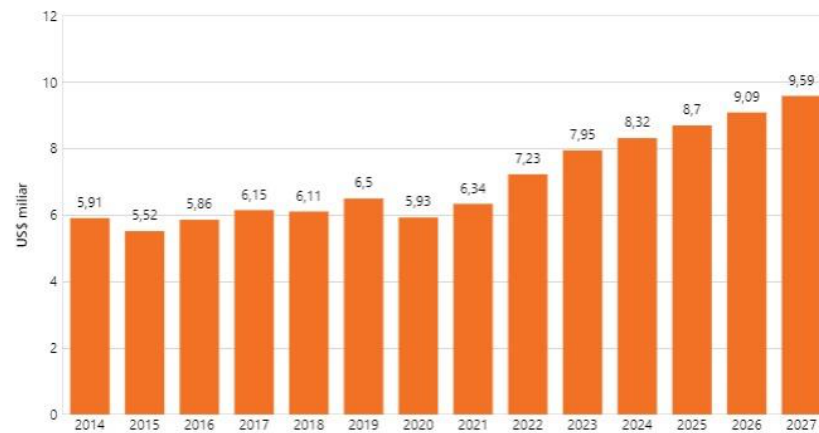


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## INTRODUCTION

The cosmetics industry sector has recently become quite popular among the public, especially women (Alfitiara Fitriana Shiddiq et al., 2023). Some women also feel that the use of cosmetics is believed to not only beautify, but also maintain and maintain beauty (Maria & Pandoyo, 2020). According to the Food and Drug Monitoring Agency (BPOM), the number of cosmetic companies skyrocketed from 819 companies to 913 companies in 2021-2022. The progress of the beauty industry in Indonesia is ranked 9th in the world. This strongly illustrates that the rapid growth rate of the cosmetics industry sector. The

development of the beauty industry sector is also supported by Indonesia's dense population of 277.7 million as of July 28, 2023, making Indonesia the 4th most populous country in the world. The existence of this dense population is the center of attention of the Ministry of Industry, where the cosmetics industry is one of the three national priority industries in the Industrial Development Master Plan (RIPIN) 2015-2035. The growing beauty industry has encouraged the emergence of various local brands, driven by increasing public interest. Despite the influx of international brands, Indonesian brands have proven their competitiveness in terms of quality and price, thus increasing people's enthusiasm and loyalty.



**Figure 1** *Indonesia Personal Care and Beauty Products Revenue Forecast (2014-2027)*

**Source:** databooks.katadata (2022)

Public enthusiasm in the beauty industry can be proven by the increase in state revenue due to beauty products amounting to IDR 111.83 Trillion in 2022 (Mutia, A, 2022). With the various brands entering Indonesia, consumers are selective in the product purchasing process. This is the background of the AR technology that gave birth to the "VTO-AR" feature. This AR technology provides a virtual experience for consumers to try on various types of effects, such as lipstick colors, eyeshadow, or other beauty products, through applications, websites, or special AR devices. AR technology, through the VTO feature, has more value in the eyes of consumers, so consumers become more confident in shopping for related brands. The VTO-AR feature can provide a more interactive experience that helps consumers feel more confident purchasing. In addition, the VTO feature helps overcome consumers' doubts that often arise when shopping online because it can reduce the risk of product mistakes. In addition to increasing consumer confidence in the brand, this can also strengthen the brand image as an innovative brand, which can ultimately benefit the brand in the long run.

According to the study of (Santika, E. F. 2023), AR increases consumer engagement and sales for cosmetic brands. The VTO-AR make-up feature with AR benefits consumers and brands that implement it by providing an innovative and engaging shopping experience. With the continued development of the technology, AR will become increasingly crucial in cosmetics marketing strategies in the future. AR technology is also one of the technologies

adopted by companies worldwide in the next five years, from 2022 to 2027. This is due to the high impact of digital commerce in the world.

AR has become a revolutionary technology in the marketing industry, especially in the context of virtual try-on makeup features. With AR, users can virtually try on various cosmetic products as if applying them directly to their faces. This feature has become a significant attraction for platforms such as e-commerce, web, and apps, as it provides consumers with an interactive and realistic experience. AR has been applied to various makeup brands in Indonesia, including Maybelline, Wardah, Emina, Make Over, Looke Cosmetics, Something, Revlon, MAC Cosmetics, and L'Oreal. These brands are well-known by the wider community, and their branding is powerful in the cosmetics industry. AR can also be utilized for companies to develop marketing strategies with solid brand branding value. The existence of mutually beneficial benefits for companies and consumers, especially regarding consumer confidence in shopping, which is increasingly supported by the VTO-AR feature, has the effect of stronger consumer purchase intention for related brands. Purchase intention is fundamental because it can directly affect a company's sales results and success. In the era of fierce business competition, especially in the increasingly widespread beauty industry, provoking the nature of purchase intention from consumers is very noteworthy.

Previous research has also discussed the role of AR in the field of cosmetics and its influence on purchase intention. Research conducted by (A. Butt et al., 2022) examines the theoretical test of AR effectiveness in China and Korea. The results of this study indicate that AR applications influence consumers in China and Korea to feel satisfied and continue to use these services. The research by (Wang et al., 2022). This study explores mobile AR services' impact on consumer purchasing behavior and brand awareness in the beauty industry. This study also wants to identify the effects of the relationship between experience flow, decision convenience, and purchase intention moderated by various consumer characteristics. This study used the SOR model research model, which chose an AR named "Youcam Makeup" as the stimulus for its questionnaire survey. In addition, this study used SPSS and AMOS to conduct data analysis. The results of this study show that AR is more relevant in fashion and beauty makeup because it provides more clarity, reality, and aesthetics. In addition, AR can also encourage exploratory behavior in consumers, which will directly affect their intention to buy. This research was conducted in Indonesia, but there is little research comparing the influence of AR in different countries or cultures. Research comparing results in Indonesia with other countries can provide insight into how cultural context affects the acceptance and effectiveness of AR technology in marketing and also focuses more on the immediate impact of AR features on purchase intention. However, there is a gap in understanding the long-term impact of AR usage on brand loyalty and repeat purchase behavior. Longitudinal research can provide deeper insights into how AR experiences affect consumers' relationships with brands over a longer period of time.

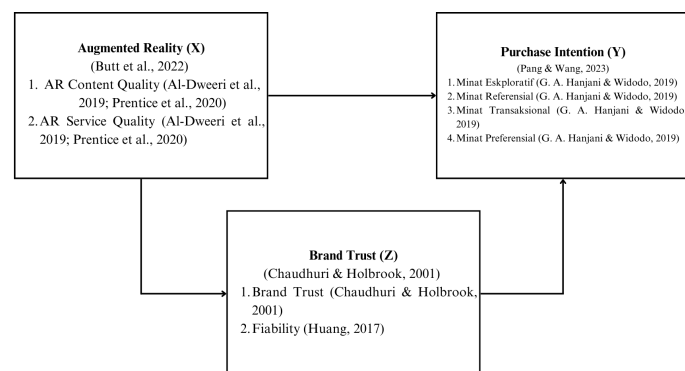
## THEORETICAL FRAMEWORK

### *Augmented Reality to Purchase Intention*

Consumer uncertainty regarding purchase decisions has increased in both offline and online shopping (Whang et al., 2021). Previous research has also stated that customers feel more risk if they do not see or try the product directly (Whang et al., 2021). This is because consumers find it difficult to evaluate products accurately (Whang et al., 2021) because consumers cannot physically experience such as touching and trying the product they want to buy so they have a minimal level of confidence in product performance. According to (Whang et al., 2021) high-quality product presentation can help reduce risk by creating a sense of no middleman, thus reducing the barrier between consumers and products. When consumers can feel the product is physically present with them, negative impressions can be reduced. The experience provided by AR is richer in product presentation with a high level of sense of presence, consumers are more likely to make a purchase decision (Hilken et al., 2017; Whang et al., 2021) H1 : Augmented Reality on cosmetic brands in Indonesia has a positive influence on the purchase intention of consumers of cosmetic brands in Indonesia.

### *Augmented reality to Purchase Intention Mediated by Brand Trust*

Brand trust as a mediating variable has been investigated by previous research by (Hanaysha, 2022a) which in this study focuses on fast food objects that examine the effects of social media marketing on purchase intention. According to this study, marketing on social media greatly influences consumer purchase intention which is supported by trust in the brand (Hanaysha, 2022a). This research is also similar to previous research in which previous research used purchase intention variables with brand trust mediation, while this study uses additional variables, namely AR variables as independent variables with different objects. In previous research, it was explained that this brand trust affects as a mediator on the purchase intention variable (Hanaysha, 2022b). H2: Augmented Reality on cosmetic brands in Indonesia has a positive influence on the purchase intention of cosmetic brand consumers in Indonesia which is mediated by brand trust.



**Figure 2** *Research Framework*

## RESEARCH METHOD

The quantitative research aims to assess the impact of augmented reality (AR) and brand trust on the purchase intentions for cosmetic products in Indonesia. Primary data was collected through questionnaires distributed to respondents, while secondary data was gathered from literature reviews, documents, and previous studies. The hypothesis testing employed a Structural Equation Model (SEM) approach based on Partial Least Squares (PLS). The population of this study focuses on consumers in Indonesia who buy makeup products using the VTO-AR feature with a minimum sample size of 200 respondents, but with the theory from (Hair et al., 2019) revealing that if you have more respondents than the minimum number it will be better so this study has 274 respondents. According to (Nunan et al., n.d.), a population is an aggregate of elements sharing common characteristics, which can be divided into parts for research purposes. The respondents, aged between 18 and 35, were chosen based on their active purchasing behavior in the cosmetic market. Another criterion for selecting respondents was that they must have bought cosmetic products in Indonesia using the VTO-AR feature, and all respondents were female. The study describes the respondents' characteristics, including gender, age group, region of residence, occupation, and cosmetic product expenditure.

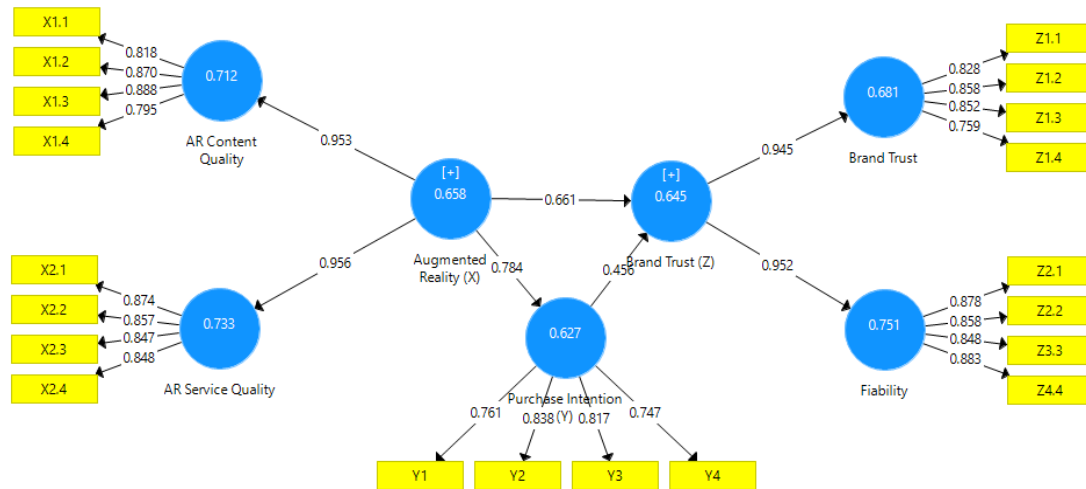
## RESULTS and DISCUSSION

Before assessing the Measurement Model, the gathered data is input and tested for indicator feasibility using the SmartPLS version 3 application. In order to measure reflective indicators, researchers first evaluate the values that are generated by each statement item. The appropriate loading levels are classified as follows by (Hair et al., 2014) : above 0.71 (excellent), 0.63 (very good), 0.50 (good), 0.45 (fair), and 0.32 (poor). Before assessing the Measurement Model, the data collecting results are entered into SmartPLS version 3 and their viability as indicators is tested. To quantify reflective indicators, researchers first evaluate each statement item's values. According to (Sarstedt et al., 2019), acceptable loading values are greater than 0.71 (excellent), 0.63 (very good), 0.50 (good), and 0.45 (fair), 0,30 (poor).

### *Evaluation of Measurement*

#### **Validity Test**

A loading factor greater than 0.7, which is excellent for the variable construct being studied, is what (Hair et al., 2014) define as valid for an indicator. Particularly in exploratory studies, values in the range of 0.6 to 0.7 are still considered acceptable in confirmatory research. In order to guarantee convergent validity for this research on concept and measurement scale development, a loading factor of at least 0.4 is required. A good correlation between indicators or items assessing distinct constructs is ensured by discriminant validity testing. If the Square Root of the Average Variance Extracted (AVE) is higher than the correlation between the latent constructs, discriminant validity is verified. As to the recommendations of (Hamid & Anwar, 2019), the AVE value ought to be greater than 0.5. The loading factor findings in the outer loading table are displayed as follows in the validity testing output generated by SmartPLS Version 3.



**Figure 3** Diagram Path PLS Algorithm

Source: Results of processed data from the smartPLS Version 3 application

**Table 1** Result of Loading Factor

	AR Content Quality	AR Service Quality	Brand Trust	Fiability	Purchase Intention
X1.1	0.818				
X1.2	0.870				
X1.3	0.888				
X1.4	0.795				
X2.1		0.874			
X2.2		0.857			
X2.3		0.847			
X2.4		0.848			
Y1					0.761
Y2					0.838
Y3					0.817
Y4					0.747
Z1.1			0.828		
Z1.2			0.858		
Z1.3			0.852		
Z1.4			0.759		
Z2.1				0.878	
Z2.2				0.858	
Z3.3				0.848	
Z4.4				0.883	

Source: Results of processed data from the smartPLS Version 3 application

After calculating the loading factor, the results reveal that indicators above 0.7 are considered "excellent." The subsequent data analysis involves evaluating the validity of each variable, specifically the Average Variance Extracted (AVE), to ensure reliability and validity. This process is detailed as follows:

**Table 2** *Construct Reliability and Validity Test Results*

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
AR Content Quality	0.864	0.866	0.908	0.712
AR Service Quality	0.879	0.879	0.917	0.733
Augmented Reality (X)	0.925	0.926	0.939	0.658
Brand Trust	0.843	0.845	0.895	0.681
Brand Trust (Z)	0.921	0.922	0.935	0.645
Fiability	0.890	0.890	0.924	0.751
Purchase Intention (Y)	0.801	0.807	0.870	0.627

**Source:** Results of processed data from the smartPLS Version 3 application

The validity test analysis in Table 2 indicates that the Average Variance Extracted (AVE) values for all constructs in the research model exceed 0.5. This confirms that the four variables' AVE values satisfy the convergent validity criteria.

### Reliability Test

More than 50% of the variance of its indicators may be explained by the construct if the composite reliability score is more than 0.7. The computed model's constructs all satisfy the discriminant validity requirements; the Brand Image construct has the lowest composite reliability score, at 0.870. Cronbach's alpha values from the SmartPLS Version 3 output, which are higher than the advised cutoff of 0.6, provide additional support for the reliability test. All of the constructs in the table have Cronbach's alpha values greater than 0.6, indicating that the study satisfies the reliability requirements.

### Evaluation of Structural Model

Analyzing and testing for construct collinearity as well as gauging the model's predictive power constitute the first steps in evaluating the structural model. The predictive power of the model is then evaluated using five criteria, including path coefficients and the coefficient of determination. The test value for exogenous variables is evaluated using the coefficient of determination (R-square). The relevance of the impact of exogenous (independent) variables on endogenous (dependent) variables is tested in order to complete this evaluation.

**Table 3** *Coefficient of Determination Results*

	R Square	R Adjusted
Purchase Intention (Y)	0.615	0.613

Source: Results of processed data from the smartPLS Version 3 application

The test results reveal a value of 0.615 for the AR and Brand Trust constructs on Purchase Decisions. Ideally, the coefficient of determination (R Square) should range between 0 and 1, with 0.60 considered vital, 0.50 moderate, and 0.25 weak. Based on the data processing results, the R Square value of 0.615, or 61.5%, indicates that the Purchase Decision variable moderately explains the variance in the dependent variable.

### Hypothesis Test

The hypothesis testing for this study, conducted using SmartPLS version 3, was carried out through the bootstrapping procedure. A 95% confidence level was applied, with a precision level or alpha limit of 5% (0.05). The hypothesis is accepted if the T-table value exceeds 1.96. The results of the bootstrapping analysis are as follows:

**Table 4** *Bootstrapping Test Result*

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values
Augmented Reality (X) -> Purchase Intention (Y)	0.784	0.782	0.031	25.137	0.000
Augmented Reality (X) -> Brand Trust (Z)	0.303	0.298	0.081	3.73	0.000

Source: Results of processed data from the smartPLS Version 3 application

**Hypothesis Testing (H1):** Table 4 confirms the first hypothesis, showing a significant impact of AR on Purchase Intention, evidenced by a T-statistic value of 25.137, which is greater than 1.96. Additionally, the p-value is 0.000, less than the alpha level of 0.05, and the original sample value is a positive 0.784. **Hypothesis Testing (H2):** Table 4 confirms the second hypothesis, showing a significant influence of AR on Brand Trust, evidenced by a T-statistic value of 3.73, which is greater than 1.96. Additionally, the p-value is 0.000, less than the alpha level of 0.05, and the original sample value is a positive 0.303.

**Table 5** *Internal Consistency and Convergent Validity Lower Order Construct*

	Cronbach's Alpha	Composite Reliability	Indicator Reliability	Average Variance Extracted (AVE)
AR Content Quality	0.860	0.905	0.863	0.705
AR Service Quality	0.876	0.915	0.878	0.729
Brand Trust	0.843	0.894	0.858	0.680
Fiability	0.890	0.924	0.892	0.751



Purchase Intention	0.801	0.870	0.809	0.627
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Source: Results of processed data from the smartPLS Version 3 application

After the calculation using the SmartPLS version 3 application shows the results in Figure 3 which can be interpreted as follows:

1. The AR variable has 2 dimensions that are used to measure variables. In the two dimensions, each has 4 indicators, all of which have a value above 0.7. This can be said that all indicators used in this AR variable dimension are valid. In addition, the two dimensions of the AR variable have an AVE value above 0.5, which can be said to be valid and can measure the AR variable. This can be said because according to Hamid & Anwar's research (2019) indicators and AVE values can be said to be valid if they have an indicator value bigger than 0.7 and an AVE value bigger than 0.5.
2. The purchase intention variable has no dimensions, because in previous studies, each purchase intention variable did not have dimensions so that it was directly measured by its indicators. In this study, the purchase intention variable is measured by 4 indicators, each of which has a loading factor value above 0.7. It can be said that the indicators used successfully measure the purchase intention variable. The purchase variable has an AVE value score of 0.627 which exceeds the AVE score limit of 0.5. It can also be concluded that the purchase intention variable is valid and can support the measurements in this study.
3. In the mediator variable, namely Brand Trust, there are 2 dimensions used to measure this variable. In these two dimensions, each has 4 indicators used to measure dimensions. In the first dimension, namely brand trust, all indicators have a loading factor score above 0.7, which can be said that the indicators in the first dimension are valid. Furthermore, in the second dimension, namely fiability, all indicators have a loading factor score above 0.7, which can be said that the indicators in the second dimension are valid. This variable also has an AVE score above 0.5 so that it can also be said that this variable is valid and can support the measurements in this study as a mediator variable.

This research also uses lower-order construct testing to provide more accurate results. The evaluation of the lower-order model carried out consists of several measurement specifications, namely internal consistency, convergent validity, and discriminant validity (Sarstedt et al., 2019). The measurement results of internal consistency and convergent validity can be seen in Table 6, and the measurement of discriminant validity can be seen in Table 7.

**Table 6** *Internal Consistency and Convergent Validity Lower Order Construct*

	Cronbach's Alpha	Composite Reliability	Indicator Reliability	Average Variance Extracted (AVE)
AR Content Quality	0.860	0.905	0.863	0.705
AR Service Quality	0.876	0.915	0.878	0.729

Brand Trust	0.843	0.894	0.858	0.680
Fiability	0.890	0.924	0.892	0.751
Purchase Intention	0.801	0.870	0.809	0.627

**Table 7** Discriminant Validity Lower Order Construct

	AR Content Quality	AR Service Quality	Brand Trust	Fiability	Purchase Intention
X1.1	<b>0.835</b>	0.634	0.599	0.512	0.651
X1.2	<b>0.870</b>	0.693	0.555	0.456	0.608
X1.3	<b>0.883</b>	0.714	0.580	0.466	0.602
X1.4	<b>0.781</b>	0.730	0.496	0.408	0.588
X2.1	0.707	<b>0.866</b>	0.493	0.484	0.620
X2.2	0.743	<b>0.863</b>	0.593	0.505	0.718
X2.3	0.668	<b>0.852</b>	0.546	0.512	0.649
X2.4	0.683	<b>0.843</b>	0.520	0.451	0.644
Y1	0.579	0.547	0.556	0.501	<b>0.762</b>
Y2	0.616	0.690	0.604	0.545	<b>0.838</b>
Y3	0.586	0.672	0.549	0.449	<b>0.816</b>
Y4	0.516	0.515	0.523	0.453	<b>0.747</b>
Z1.1	0.585	0.530	<b>0.841</b>	0.640	0.619
Z1.2	0.603	0.539	<b>0.868</b>	0.668	0.619
Z1.3	0.580	0.596	<b>0.855</b>	0.670	0.604
Z1.4	0.388	0.395	<b>0.729</b>	0.660	0.471
Z2.1	0.456	0.515	0.707	<b>0.877</b>	0.544
Z2.2	0.484	0.443	0.694	<b>0.850</b>	0.494
Z3.3	0.479	0.491	0.645	<b>0.852</b>	0.524
Z4.4	0.484	0.527	0.709	<b>0.887</b>	0.573

Internal consistency can be seen from Cronbach's alpha and composite reliability values, which must be above 0.7. The results show that all Cronbach's alpha and composite reliability values of all dimensions after testing are above 0.7, which means that these values are acceptable. Convergent validity testing can be done by looking at the indicator reliability value and Average Variance Extracted (AVE). The indicator reliability value must be greater than 0.7, while the AVE value itself must be greater than 0.5 to be acceptable.

Based on the data obtained from the test results, all reliability indicator values are above 0.7. In addition, all AVE values are above 0.5, which means they are acceptable. Meanwhile, the discriminant validity test is carried out using the cross-loading method; based on the data above, it can be seen if the value of each indicator exceeds other indicators on the same diagonal. Therefore, it can be concluded that the data is proven valid. From the results of the analysis carried out above, it can be concluded that in the lower-order component, all dimensions in this study, namely the independent and dependent variables, fall into the valid and reliable category, and all dimensions in the independent variable affect the dependent variable. This study has 2 hypotheses which look at the effect of the dependent and independent variables and see the effect of the mediator variable on the main variable. Based on the results of data processing used with SmartPLS 3 software, it shows that the hypothesis in this study is accepted because it has a score value above the threshold.

## CONCLUSIONS

The research discusses the impact of AR features, specifically VTO-AR), on purchase intention through brand trust in the context of cosmetic products in Indonesia. The independent variable in this study is AR, the dependent variable is purchase intention, and the mediating variable is brand trust. The study employs two dimensions: AR Content Quality and AR Service Quality, adapted from (A. Butt et al., 2022; A. H. Butt et al., 2024). Data were collected using an online questionnaire distributed via social media platforms such as WhatsApp, Instagram, and Twitter, resulting in a sample of 274 respondents from various cities and provinces across Indonesia. The data from these 274 respondents were processed using quantitative analysis with the aid of software tools, followed by an analysis of the results.

Based on the calculations performed with SmartPLS 3, the outer model or Confirmatory Factor Analysis (CFA) model indicates that all included indicators are valid and reliable. The inner model or structural model in the CFA demonstrates that all dimensions used in this study have positive parameter coefficients and a significance value much less than 5%, indicating that all dimensions effectively measure the variables of AR, purchase intention, and brand trust. These results reveal a positive influence of the independent variable AR on the dependent variable purchase intention, mediated by brand trust. This positive influence also indicates a strong and moderate measurement strength. Using the disjoint two-stage approach in this study aims to analyze the lower-order construct. The results show that the validity and reliability values of all used dimensions are acceptable, and all dimensions of the AR variable influence the dimensions of purchase intention mediated by the dimensions of brand trust.

Based on the results of data processing with SmartPLS 3 software and showing valid and reliable results, it shows that the hypothesis in this study is accepted, which between variables has a strong influence on the object of research Augmented Reality on Cosmetic Products in Indonesia. In further research, it can analyze marketing strategies in more detail so that it can further strengthen the evidence that Augmented Reality can play an important role in the field of marketing strategies, especially make-up products. In addition, it can also analyze a wider range of products in the use of the Virtual Try On feature because

there are still many types of products that use the Augmented Reality system where the research results can be used as additional information for companies that need it. Thus, this research can be better and can provide broader insights and have various aspects of view for business people in making the company's marketing strategy.

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