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The Influence of Augmented Reality (AR) Technology Implementation on Purchase Decisions for Wardah Products: The Mediating Role of Shopping Experience

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ABSTRACT

The rapid advancement of digital technology has encouraged cosmetic companies to integrate Augmented Reality (AR) into online shopping platforms to create more interactive and personalized consumer experiences. Despite the increasing adoption of AR, empirical evidence regarding the mechanism through which this technology influences purchase decisions remains limited, particularly within Indonesia's cosmetics industry. This study aims to examine the influence of Augmented Reality technology implementation on purchase decisions for Wardah products, with shopping experience serving as a mediating variable. A quantitative research approach was employed by distributing questionnaires to 204 Indonesian consumers who had previously used AR features when purchasing Wardah products online. Data were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 software. The findings reveal that Augmented Reality technology has a positive and significant effect on both shopping experience and purchase decisions. In addition, shopping experience positively influences purchase decisions and partially mediates the relationship between AR technology and purchase decisions. These results indicate that immersive virtual experiences enhance consumers' trust, engagement, and confidence throughout the purchasing decision-making process. This study extends the application of the Technology Acceptance Model (TAM) by confirming the mediating role of shopping experience in the relationship between AR technology and purchase decisions. Furthermore, the findings provide practical implications for cosmetic companies in developing AR-based digital marketing strategies that enhance customer experiences and encourage purchase decisions.

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1. INTRODUCTION

The continuous advancement of digital technology has reshaped the way consumers search for information, evaluate products, and make purchasing decisions. The rapid expansion of internet connectivity, mobile technologies, and e-commerce platforms has encouraged businesses to develop shopping environments that are more interactive, personalized, and convenient. As market competition intensifies, companies are expected not only to deliver high-quality products but also to provide engaging customer experiences that foster satisfaction and encourage purchasing behavior. Among the emerging digital technologies, Augmented Reality (AR) has become one of the most influential innovations for enhancing online shopping by allowing consumers to visualize products realistically before making purchasing decisions, thereby minimizing uncertainty and increasing confidence during the buying process [7], [13], [14].

Augmented Reality combines virtual content with the physical environment in real time, creating an interactive experience that enables consumers to assess products prior to purchase. Within digital marketing, AR is extensively implemented through virtual try-on applications, particularly in the cosmetics sector, allowing users to evaluate product shades, textures, and compatibility with their facial characteristics without physically applying the products. By offering this immersive experience, AR enhances consumers' perceptions of usefulness, ease of use, and trust, ultimately improving the overall shopping experience [2], [7], [14]. This phenomenon is consistent with the Technology Acceptance Model (TAM), which explains that individuals are more likely to adopt a technology when they perceive it as useful and easy to use [4].

Indonesia's cosmetics industry has undergone substantial digital transformation alongside the rapid growth of e-commerce and smartphone usage. Consumers increasingly demand shopping experiences that are personalized, engaging, and technology-driven, motivating cosmetic companies to integrate digital innovations into their marketing activities. One notable example is Wardah, which has introduced an AR-based Virtual Try-On feature that enables consumers to virtually test cosmetic products before purchasing them. This innovation is expected to reduce perceived purchase risk, improve product evaluation accuracy, and enhance customer satisfaction by supporting more informed purchasing decisions [12], [13], [16].

Existing studies have consistently reported that AR technology positively influences multiple dimensions of consumer behavior, including customer engagement, perceived usefulness, perceived enjoyment, trust, and purchase intention [1], [7], [10], [14]. In addition, immersive AR experiences strengthen consumers' emotional connections with products and brands by creating more interactive and memorable shopping experiences [2], [6]. Despite these findings, the majority of previous research has concentrated on examining the direct relationship between AR and purchase intention rather than actual purchase decisions. Furthermore, empirical evidence explaining how AR influences purchase decisions through the mediating role of shopping experience remains limited, particularly in the context of Indonesia's cosmetics industry and local cosmetic brands [3], [11], [13]. This limitation highlights the need for further investigation into the mechanisms through which shopping experience translates AR usage into actual purchasing behavior.

Shopping experience represents a crucial factor influencing consumers' purchasing decisions because it encompasses perceptions of convenience, enjoyment, trust, interaction, and overall satisfaction throughout the shopping process. A positive shopping experience increases consumers' confidence in selecting products and encourages them to complete the purchasing process. Conversely, unfavorable shopping experiences may diminish the effectiveness of AR technology despite its advanced features and capabilities [3], [10]. Therefore, shopping experience is proposed as a mediating construct that explains the relationship between AR technology implementation and consumers' purchase decisions.

This study adopts the Technology Acceptance Model (TAM) as the underlying theoretical framework for explaining consumers' acceptance of AR technology. According to TAM, perceived usefulness and perceived ease of use are the key determinants shaping users' attitudes and behavioral intentions toward adopting new technologies [4]. In an AR shopping environment, consumers who perceive the technology as beneficial and easy to operate are more likely to experience greater shopping satisfaction, which subsequently increases their likelihood of making purchasing decisions [7], [14]. Accordingly, TAM provides a robust theoretical foundation for examining the relationships among AR technology implementation, shopping experience, and purchase decisions.

Based on these considerations, this study aims to examine the effect of Augmented Reality (AR) technology implementation on consumers' purchase decisions for Wardah cosmetic products, with shopping experience serving as a mediating variable. The findings are expected to enrich the literature on digital marketing, consumer behavior, and technology adoption by providing empirical evidence regarding the mediating role of shopping experience in the relationship between AR technology and purchase decisions. Moreover, this study offers practical insights for cosmetic companies seeking to optimize AR-based marketing strategies to enhance customer experience, strengthen consumer engagement, and improve purchasing outcomes in an increasingly competitive digital marketplace.

2. METHOD

This research adopted a quantitative approach to investigate the effect of Augmented Reality (AR) technology implementation on consumers' purchase decisions for Wardah cosmetic products, with shopping experience acting as a mediating variable. A cross-sectional survey design was employed because it allows the relationships among research variables to be examined at a single point in time and is widely recommended for studies involving consumer behavior and technology adoption [5].

The target population comprised Indonesian consumers who had previously used Augmented Reality technology while purchasing Wardah cosmetic products. A purposive sampling technique was applied to ensure that all respondents fulfilled the predefined eligibility criteria, namely: (1) at least 18 years of age, (2) residing in Indonesia, (3) having used Wardah's AR or Virtual Try-On feature, and (4) having purchased or expressed an intention to purchase Wardah products after experiencing the AR feature. Purposive sampling is considered appropriate for selecting respondents with specific characteristics and relevant experience related to the research context [5]. After the data screening process, 204 valid questionnaires were retained for further statistical analysis.

Primary data were collected through a structured online questionnaire consisting of two sections. The first section obtained respondents' demographic profiles, whereas the second section measured the latent constructs investigated in this study. The measurement items were adapted from previously validated instruments related to Augmented Reality implementation, shopping experience, and purchase decision [7], [13], [14]. All responses were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The proposed research framework included three latent variables: Augmented Reality Technology Implementation as the independent variable, Shopping Experience as the mediating variable, and Purchase Decision as the dependent variable.

The collected data were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 software. This analytical approach was selected because it is well suited for prediction-oriented studies, mediation analysis, and the estimation of complex structural models involving multiple reflective latent constructs [5]. The analysis was conducted in two sequential stages, namely the evaluation of the measurement model (outer model) followed by the assessment of the structural model (inner model).

The measurement model was assessed by examining indicator reliability, internal consistency reliability through Cronbach's Alpha and Composite Reliability (CR), convergent validity using the

Average Variance Extracted (AVE), and discriminant validity through the Heterotrait–Monotrait Ratio (HTMT) [5]. Subsequently, the structural model was evaluated by analyzing the path coefficients, coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2). Hypothesis testing was performed using the bootstrapping procedure with 5,000 resamples, while statistical significance was determined at the 5% significance level ($p < 0.05$) in accordance with current recommendations for PLS-SEM applications in marketing and information systems research [5].

3. RESULT AND DISCUSSION

3.1 Overview of the Research Subject

This study targeted consumers of Wardah, one of Indonesia's leading halal cosmetic brands, who had experience using Augmented Reality (AR) features during online shopping. Wardah has incorporated AR technology, particularly through its Virtual Try-On feature, to allow consumers to virtually evaluate cosmetic products before making purchasing decisions. This technology is intended to improve the online shopping experience by facilitating product evaluation, increasing convenience, and reducing uncertainty associated with purchasing cosmetic products online [7], [12], [13].

The study collected data from 204 Indonesian respondents selected using a purposive sampling technique. To ensure that participants possessed relevant experience related to the research objectives, respondents were required to satisfy the following criteria: (1) be at least 18 years old, (2) reside in Indonesia, (3) have previously used Wardah's AR or Virtual Try-On feature while shopping online, and (4) have purchased or expressed an intention to purchase Wardah products after using the AR feature [5].

The respondents represented diverse demographic characteristics, including differences in age, educational background, occupation, and geographic distribution across Indonesia. Such diversity enhances the representativeness of the sample and provides broader insights into consumers' perceptions of AR technology implementation within Indonesia's cosmetics industry. The responses obtained from the survey were subsequently analyzed using the Partial Least Squares–Structural Equation Modeling (PLS-SEM) approach to examine the relationships among Augmented Reality Technology Implementation, Shopping Experience, and Purchase Decision [5].

3.2 Model Evaluation

3.2.1 Measurement Model (*Outer Model)*

1. Validitas Convergence

Table 1. Convergent Validity Test

Variable	Buying Decision	Application of AR Technology	Shopping Experience
AR1		0,852	
AR2		0,796	
AR3		0,866	
AR4		0,872	
AR5		0,850	
AR6		0,873	
AR7		0,866	
AR8		0,873	
AR9		0,886	
KM1	0,914		
KM2	0,888		

Variable	Buying Decision	Application of AR Technology	Shopping Experience
KM3	0,868		
KM4	0,869		
KM5	0,876		
KM6	0,890		
KM7	0,893		
KM8	0,897		
KM9	0,902		
PB1			0,911
PB2			0,868
PB3			0,853
PB4			0,864
PB5			0,881
PB6			0,859
PB7			0,844
PB8			0,890
PB9			0,901

Source: Processed Author, 2026

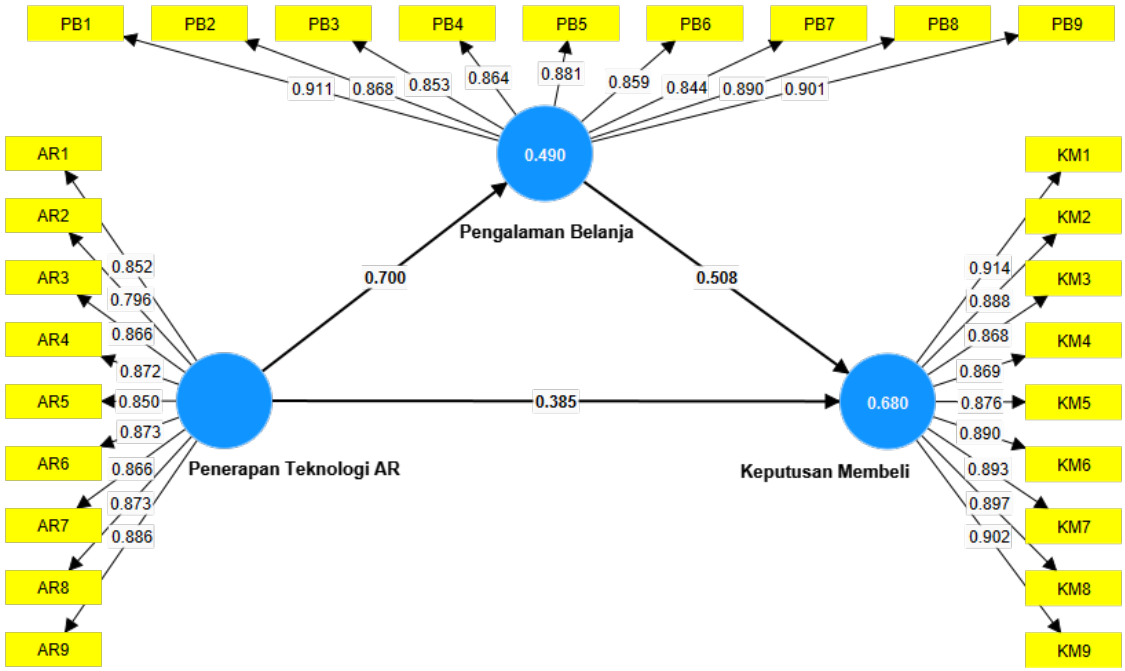

Figure 1. Structural Models
Source: Output Processed by the Author

Based on Table 1, all indicators exhibit factor loading values greater than 0.70, indicating that each indicator has a strong correlation with its respective latent construct. These results demonstrate that all measurement indicators satisfy the recommended threshold for indicator reliability and can therefore be considered valid measures of their corresponding latent variables.

2. Validitas Diskriminan

Table 2. Fornell-Larcker Criterion Value

Variable	Buying Decision	Application of AR Technology	Shopping Experience
Buying Decision	0,889		
Application of AR Technology	0,741	0,860	
Shopping Experience	0,778	0,700	0,875

Source: SmartPLS Output Results (v.4.2.9)

Table 3. Cross loading value

Item	Buying Decision	Application of AR Technology	Shopping Experience
AR1	0,678	0,852	0,672
AR2	0,503	0,796	0,528
AR3	0,688	0,866	0,631
AR4	0,692	0,872	0,641
AR5	0,613	0,850	0,561
AR6	0,601	0,873	0,568
AR7	0,633	0,866	0,568
AR8	0,655	0,873	0,609
AR9	0,637	0,886	0,617
KM1	0,914	0,715	0,719
KM2	0,888	0,668	0,689
KM3	0,868	0,621	0,671
KM4	0,869	0,627	0,701
KM5	0,876	0,629	0,694
KM6	0,890	0,735	0,695
KM7	0,893	0,616	0,683
KM8	0,897	0,630	0,669
KM9	0,902	0,671	0,696
PB1	0,708	0,666	0,911
PB2	0,658	0,557	0,868
PB3	0,645	0,572	0,853
PB4	0,681	0,604	0,864
PB5	0,727	0,617	0,881
PB6	0,697	0,604	0,859
PB7	0,646	0,652	0,844
PB8	0,670	0,604	0,890
PB9	0,683	0,629	0,901

Source: Processed Author, 2026

Based on Tables 2 and 3, all measurement items exhibit cross-loading values greater than 0.70. Furthermore, each indicator demonstrates the highest loading on its corresponding latent variable compared with the loadings on other latent variables. These findings indicate that the indicators adequately represent their intended constructs and provide evidence of satisfactory discriminant validity.

3. Reliability

Table 4. Reliability Test

Variabel	Cronbach's alpha	Composite reliability (rho_c)	Average variance extracted (AVE)
Buying Decision	0,967	0,971	0,790
Application of AR Technology	0,956	0,962	0,739
Shopping Experience	0,962	0,967	0,765

Source: Processed Author, 2026

Based on Table 4, all research constructs exhibit Composite Reliability values greater than 0.70, while the Cronbach's Alpha and Average Variance Extracted (AVE) values exceed 0.50. These results indicate that all constructs demonstrate satisfactory internal consistency reliability and convergent validity. Therefore, the measurement model meets the recommended reliability and validity criteria, allowing the analysis to proceed to the evaluation of the structural model (inner model) to assess the overall model fit and test the proposed relationships among the constructs.

4. VIF

Table 5. VIF Value

Item	LIVE
AR1	3,267
AR2	2,512
AR3	3,285
AR4	3,380
AR5	3,765
AR6	4,571
AR7	3,661
AR8	4,086
AR9	3,829
KM1	4,851
KM2	3,919
KM3	3,540
KM4	3,426
KM5	3,644
KM6	3,865
KM7	4,157
KM8	4,452
KM9	4,584
PB1	4,756
PB2	3,525
PB3	3,325
PB4	3,532
PB5	3,839
PB6	3,348
PB7	2,931

Item	LIVE
PB8	4,366
PB9	4,704

Source: SmartPLS Output Results (v.4.2.9)

Based on the VIF values presented in the table, all indicators have Variance Inflation Factor (VIF) values below 5.00, indicating the absence of multicollinearity among the variables. These findings suggest that the predictor variables do not exhibit excessive collinearity, ensuring that the estimation of path coefficients and significance testing can be performed reliably without bias caused by multicollinearity.

5. HTM

Table 6. HTMT

Variable	Buying Decision	Application of AR Technology	Shopping Experience
Buying Decision			
Application of AR Technology	0,765		
Shopping Experience	0,806	0,727	

Source: Processed Author, 2026

The Heterotrait-Monotrait Ratio value of the table of 4.10 is not above 0.9 so it can be said that the research model formed from the five variables above is valid.

3.3.1 Model Struktural (*Inner Model)*

After conducting *the outer model* test, the next step is to conduct *an inner model* test. Internal *model* testing or structural model is carried out to see the relationship between the construct, significance value and *R-square* of the research model. The evaluation of the PLS structural model begins by looking at *the R-square* of each latent dependent variable. Table 7 is the result of *the R-square* estimate using PLS.

1. R Square

Table 7. R Square *Test Results*

Variabel	R-*Square*	R-*Square Adjusted*
Buying Decision	0,680	0,677
Shopping Experience	0,490	0,488

Based on Table 7, the R-Square (R^2) value for the Purchase Decision variable is 0.680. This indicates that the variation in purchase decisions can be explained by the independent variables included in this research by 68.0%. Meanwhile, the remaining 32.0% is influenced by other factors outside the proposed research model that were not examined in this study. Therefore, the model demonstrates a substantial explanatory capability in predicting consumers' purchase decisions..

2. F Square

The f-square value in PLS can be used to see the effect size of any variable present in the model. The f-square values of 0.02, 0.12, and 0.35 indicate that the model is weak, moderate, and strong.

Table 8. F Square *Test Results*

Variable	Buying Decision	Application of AR Technology	Shopping Experience
Buying Decision			
Application of AR Technology	0,236		0,962
Shopping Experience	0,411		

Source: SmartPLS Output Results (v.4.2.9)

Based on the f-square value, it can be concluded that the effect of the application of AR Technology on Buying Decisions of 0.236 is included in the moderate category. The effect of Shopping Experience on Purchase Decisions of 0.411 is included in the strong category. In addition, the effect of the application of AR Technology on the Shopping Experience of 0.962 is included in the strong category.

3. Predictive Relevance (Q Square)

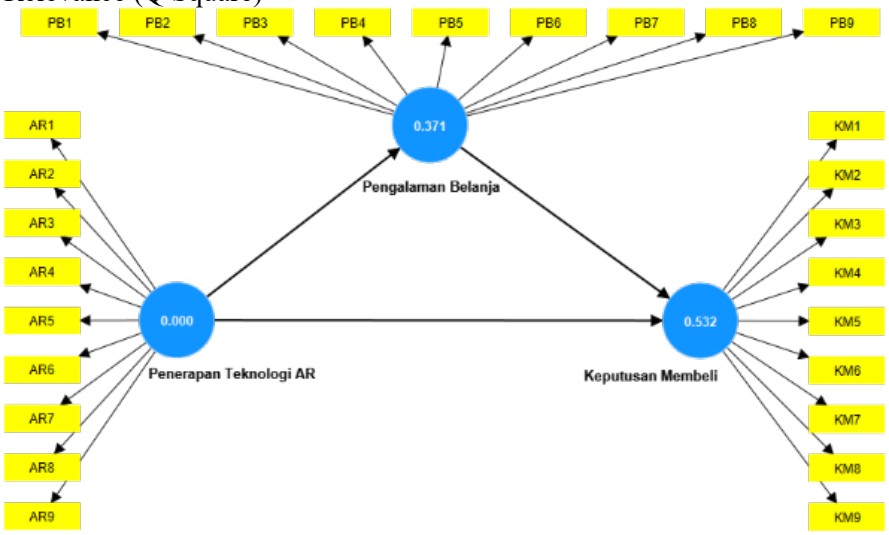

Figure 2. Predictive Relevance
Source: SmartPLS Output Results (v.4.2.9)

Based on the image above, it can be concluded in the table below:

Table 9. Predictive Relevance

Variabel	Q^2 (=1-SSE/SSO)	Remarks
Buying Decision	0,532	Has a predictive relevance value
Shopping Experience	0,371	Has a predictive relevance value

Source: SmartPLS Output Results (v.4.2.9)

Based on the results presented in the table above, the Q-Square (Q^2) value for the dependent variable is greater than 0, indicating that the research model has adequate predictive relevance. A Q^2 value above zero demonstrates that the model is capable of predicting the endogenous construct effectively. Therefore, the structural model in this study can be considered to have good predictive capability and is appropriate for further interpretation.

4. Hipothesis Testing Results

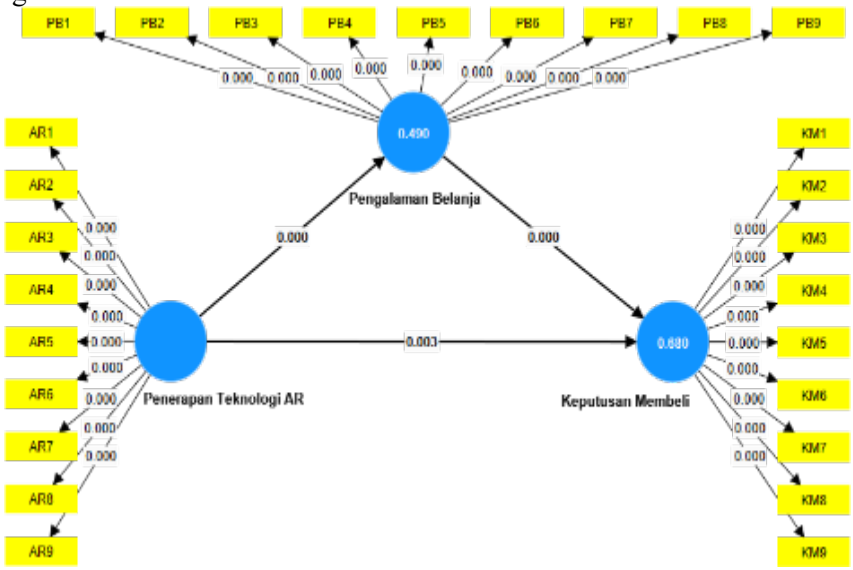

Figure 3. Hypothesis Testing
Source: SmartPLS Output Results (v.4.2.9)

Table 10. Hypothesis Testing

Variabel	Original Sample (O)	T Statistics (| O/STDEV |)	P Values
The Application of AR Technology - > Shopping Experience	0,700	10,663	0,000
Shopping Experience - > Buying Decision	0,508	3,628	0,000
Application of AR Technology -> Buying Decision	0,385	3,001	0,003
Application of AR Technology -> Shopping Experience -> Buying Decision	0,356	3,026	0,002

Source: SmartPLS Output Results (v.4.2.9)

The following are the results of the OT *bootstrapping* analysis as follows:

1. The hypothesis testing results regarding the effect of Augmented Reality (AR) technology implementation on shopping experience indicate a path coefficient value of 0.700, a p-value of 0.000 (< 0.05), and a t-statistic value of 10.663 (> 1.960). These results demonstrate that AR technology implementation has a positive and significant influence on consumers' shopping experience. Therefore, the hypothesis proposing that AR technology implementation affects shopping experience is supported.
2. The hypothesis testing results regarding the influence of shopping experience on purchase decisions show a path coefficient value of 0.508, a p-value of 0.000 (< 0.05), and a t-statistic value of 3.628 (> 1.960). These findings indicate that shopping experience has a positive and significant effect on consumers' purchase decisions. Thus, the hypothesis stating that shopping experience influences purchase decisions is supported.
3. The hypothesis testing results concerning the effect of AR technology implementation on purchase decisions reveal a path coefficient value of 0.385, a p-value of 0.003 (< 0.05), and a t-statistic value of 3.001 (> 1.960). These results confirm that AR technology implementation has a positive and significant impact on consumers' purchase decisions. Therefore, the hypothesis proposing that AR technology implementation affects purchase decisions is supported.
4. The hypothesis testing results regarding the indirect effect of AR technology implementation on purchase decisions through shopping experience as a mediating variable show a path coefficient value of 0.205, a p-value of 0.000 (< 0.05), and a t-statistic value of 3.682 (> 1.960).

These results indicate that shopping experience significantly mediates the relationship between AR technology implementation and purchase decisions. Consequently, the hypothesis stating that AR technology implementation influences purchase decisions through shopping experience is supported.

4. CONCLUSION

This study investigated the impact of Augmented Reality (AR) technology implementation on consumers' purchase decisions for Wardah products, with shopping experience serving as a mediating variable. The findings reveal that AR technology implementation has a positive and significant effect on consumers' shopping experiences and purchase decisions. Moreover, shopping experience significantly influences purchase decisions and partially mediates the relationship between AR technology implementation and purchase decisions. These findings indicate that consumers are more likely to proceed with purchasing decisions when AR technology provides an interactive, informative, and enjoyable shopping experience.

This research contributes to the existing literature on digital consumer behavior by expanding the application of the Technology Acceptance Model (TAM) within the context of AR-based cosmetic retailing. The study emphasizes that shopping experience represents an important mechanism through which AR technology generates positive consumer responses and influences purchasing outcomes. From a managerial perspective, cosmetic companies should continuously develop AR-based marketing strategies by enhancing technological usability, interactivity, and consumer engagement to increase customer confidence and encourage purchase decisions.

Nevertheless, this study has several limitations that should be acknowledged. The research sample was limited to Wardah consumers in Indonesia, and the cross-sectional research design may limit the ability to generalize the findings across different consumer groups and contexts. Future studies are recommended to explore other cosmetic brands, broader populations, or different retail industries. Additionally, future research may consider incorporating other relevant variables, such as customer trust, perceived value, customer satisfaction, and brand loyalty, to provide a more comprehensive understanding of consumer behavior in technology-driven shopping environments.

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