

The Impact of Virtual Try-on Technology on Consumer Purchase Decision in Cosmetics

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ABSTRACT

This study examines the influence of Virtual Try-On (VTO) technology on consumer purchase decisions in the cosmetics industry. Although VTO enables consumers to preview cosmetic products digitally and reduces the uncertainty associated with online purchases, the extent to which specific VTO-related perceptions translate into purchase decisions remains important to examine. Drawing on the Technology Acceptance Model and the value-oriented perspective described in the study, three factors were examined: perceived diagnosticity, perceived usefulness, and consumer perception. A quantitative, cross-sectional survey design was employed. Data were collected through an online questionnaire using a five-point Likert scale from 384 online consumers in Melaka who had experience using VTO technology. The data were analysed using SPSS through descriptive statistics, Cronbach's alpha, Pearson correlation, and multiple linear regression. The pilot test involving 30 respondents demonstrated strong internal consistency, with Cronbach's alpha values ranging from 0.897 to 0.956 across the constructs. The main findings indicate that perceived diagnosticity, perceived usefulness, and consumer perception were all significantly and positively associated with consumer purchase decision ($p < 0.001$). The regression model was statistically significant, $F(3,380) = 826.413$, $p < 0.001$, with $R^2 = 0.867$, indicating that the three predictors jointly explained 86.7% of the variance in consumer purchase decision. Perceived usefulness was the strongest predictor ($\beta = 0.484$), followed by perceived diagnosticity ($\beta = 0.254$) and consumer perception ($\beta = 0.221$). The findings suggest that cosmetic brands and e-commerce platforms should prioritise accurate, useful, and trustworthy VTO experiences to support consumers' purchase decisions.

Keywords: Virtual Try-On Technology, Perceived Diagnosticity, Perceived Usefulness, Consumer Perception, Consumer Purchase Decision

INTRODUCTION

Virtual Try-On (VTO) technology has emerged as an important digital retailing application that allows consumers to preview how products may appear on them before making a purchase. In cosmetics, VTO commonly uses augmented reality, facial recognition, artificial intelligence and three-dimensional rendering to simulate products such as lipstick, foundation and eyeshadow on a consumer's image. This capability addresses a central limitation of online cosmetics shopping: consumers cannot physically test product colour, appearance or suitability before purchase. Prior research on augmented and virtual reality suggests that immersive product presentation can strengthen product understanding, engagement and the online shopping experience Beck and Crié (2018), Cruz-Cárdenas et al. (2019), Hilken et al. (2022), and Krejcie and Morgan (1970).

Despite these benefits, consumers may still experience uncertainty about whether the virtual representation accurately reflects the actual product. Problems associated with realism, colour matching, facial recognition, interface usability and product variety can reduce confidence in VTO-enabled shopping. The literature therefore

highlights the importance of understanding how consumers evaluate the information and utility provided by VTO and how these evaluations influence purchase-related behaviour. In particular, perceived diagnosticity concerns the extent to which VTO helps consumers assess product suitability and reduce uncertainty, while perceived usefulness reflects the extent to which the technology assists consumers in accomplishing their shopping goals Davis (1989). Consumer perception captures broader evaluations such as confidence, comfort, trust and overall impressions of VTO.

The present study focuses on consumers in Melaka who have used VTO for online cosmetics shopping. The study addresses three objectives: (1) to identify the factors that influence consumer purchase decisions in cosmetics; (2) to examine the relationships between perceived diagnosticity, perceived usefulness, consumer perception and consumer purchase decision; and (3) to determine which factor has the greatest influence on consumer purchase decision. The study contributes empirical evidence on VTO-enabled cosmetic purchasing and provides practical guidance for cosmetic brands and e-commerce platforms seeking to improve digital customer experiences.

Theoretical foundation and hypotheses

The study is theoretically informed by the Technology Acceptance Model (TAM) and the value-oriented adoption perspective discussed in the thesis. TAM proposes that perceived usefulness is a central determinant of technology-related acceptance and behavioural responses Davis (1989). In the context of VTO, usefulness is particularly relevant because the technology is expected to help consumers evaluate products, save time and make more informed decisions. The value perspective further supports the idea that consumers evaluate technology according to the benefits and experiences obtained from its use. Accordingly, the present study operationalises VTO-related evaluations through perceived diagnosticity, perceived usefulness and consumer perception, with consumer purchase decision as the outcome.

Perceived diagnosticity refers to the degree to which information provided by VTO helps consumers distinguish between alternatives and evaluate product suitability. When a virtual representation provides a clear and credible indication of how a cosmetic product may look on the consumer, uncertainty is reduced and confidence in the purchase decision may increase. Prior research on virtual and augmented retailing similarly indicates that richer product presentation can improve product understanding and customer evaluation Beck and Crié (2018), Cruz-Cárdenas et al. (2019), and Krejcie and Morgan (1970). Therefore, the study proposes:

H1: Perceived diagnosticity positively influences consumer purchase decision.

Perceived usefulness refers to the degree to which consumers believe that using VTO improves their shopping task. For cosmetic purchases, usefulness may be reflected in easier product selection, time savings and greater confidence in making an informed decision. Because these utilitarian benefits directly support the purchase process, perceived usefulness is expected to increase purchase decision. Thus:

H2: Perceived usefulness positively influences consumer purchase decision.

Consumer perception represents consumers' overall evaluation of VTO, including confidence, comfort, trustworthiness and the overall impression of online cosmetic shopping. A favourable perception may strengthen willingness to proceed with a purchase because consumers feel more comfortable and confident when using the technology. This expectation is consistent with research showing that interactive and immersive technologies can influence consumer engagement and shopping experiences Cruz-Cárdenas et al. (2019) and Krejcie and Morgan (1970). Therefore:

H3: Consumer perception positively influences consumer purchase decision.

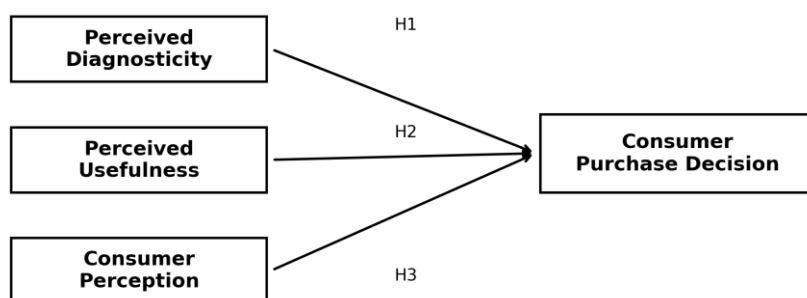


Figure 1. Conceptual framework of the study.

METHODOLOGY

Research design and sampling

A quantitative, cross-sectional survey design was employed using a deductive approach. The target population comprised online consumers who had used VTO technology for cosmetics shopping. The study collected data in Melaka and targeted consumers aged from below 18 to 36 years. A convenience sampling approach was used to recruit respondents through online channels, including WhatsApp, Facebook and university networks. The required sample size was 384, based on the sampling rationale reported in the thesis and the Krejcie and Morgan approach Sung et al. (2021). All 384 questionnaires were reported as completed and usable, giving a 100% response rate.

Instrument and data collection

Data were collected using a structured Google Forms questionnaire consisting of demographic questions and 16 measurement items. The substantive constructs comprised perceived diagnosticity, perceived usefulness, consumer perception and consumer purchase decision, with four items measuring each construct. All items were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The perceived diagnosticity items assessed the ability of VTO to represent cosmetic appearance and product suitability; perceived usefulness items assessed decision support, time saving and shopping usefulness; consumer perception items assessed confidence, comfort, trust and overall impressions; and purchase decision items assessed willingness, speed, spending and commitment to purchase.

Data analysis

SPSS was used for data analysis. Descriptive statistics were used to summarise respondent characteristics and construct-level responses. Cronbach's alpha was used to assess internal consistency based on a pilot test of 30 respondents. Pearson correlation was then applied to assess the strength and direction of associations between the independent variables and consumer purchase decision. Finally, multiple linear regression was used to estimate the simultaneous contribution of perceived diagnosticity, perceived usefulness and consumer perception to consumer purchase decision.

RESULTS

Respondent profile

Table 1. Demographic profile of respondents (N = 384).

Characteristic	Category	n	%
Age	Below 18 years	56	14.6

	19–24 years	151	39.3
	25–30 years	105	27.3
	31–36 years	72	18.8
Gender	Female	247	64.3
	Male	137	35.7
Ethnicity	Malay	240	62.5
	Chinese	74	19.3
	Indian	51	13.3
	Other	19	4.9
Education	SPM	77	20.1
	STPM/Diploma/Matriculation	92	24.0
	Bachelor's degree	183	47.7
	Master's degree	10	2.6
	PhD/Doctorate	12	3.1
	Other	10	2.6
Occupation	Student	183	47.7
	Government	67	17.4
	Private sector	93	24.2
	Self-employed	34	8.9
	Unemployed	7	1.8

The sample was predominantly female (64.3%), with the largest age group being 19–24 years (39.3%). Malay respondents accounted for 62.5% of the sample. Almost half of the respondents held a bachelor's degree (47.7%), while students represented the largest occupational group (47.7%). These characteristics indicate that the sample largely represents young, digitally engaged online consumers.

Reliability analysis

Table 2. Pilot-test reliability of the measurement scales (n = 30).

Construct	Items	Cronbach's α	Interpretation
Perceived Diagnosticity	4	0.897	Excellent
Perceived Usefulness	4	0.953	Excellent
Consumer Perception	4	0.956	Excellent
Consumer Purchase Decision	4	0.926	Excellent

The pilot test demonstrated strong internal consistency across all four constructs. Cronbach's alpha values ranged from 0.897 to 0.956, exceeding the commonly applied threshold of 0.70. Consumer perception recorded the highest alpha (0.956), while perceived diagnosticity recorded the lowest (0.897), indicating that the questionnaire items were sufficiently consistent for the main survey.

Descriptive statistics

Table 3. Descriptive statistics of the study constructs.

Construct	N	Mean	SD
Perceived Diagnosticity	384	3.92	1.036
Perceived Usefulness	384	3.97	1.010
Consumer Perception	384	3.92	1.022
Consumer Purchase Decision	384	3.91	1.017

All construct means were above the midpoint of the five-point scale, indicating generally favourable evaluations of VTO. Perceived usefulness recorded the highest mean ($M = 3.97$, $SD = 1.010$), followed by perceived diagnosticity and consumer perception (both $M = 3.92$), while consumer purchase decision recorded $M = 3.91$ ($SD = 1.017$).

Pearson correlation analysis

Table 4. Pearson correlations among study constructs (N = 384).

Variable	PD	PU	CP	CPD
Perceived Diagnosticity (PD)	1.000	0.932	0.898	0.898
Perceived Usefulness (PU)	0.905	1.000	0.901	0.913
Consumer Perception (CP)	0.932	0.901	1.000	0.894
Consumer Purchase Decision (CPD)	0.898	0.913	0.894	1.000

All correlations with consumer purchase decision were positive and statistically significant at $p < 0.001$. Perceived usefulness showed the strongest correlation with consumer purchase decision ($r = 0.913$), followed by perceived diagnosticity ($r = 0.898$) and consumer perception ($r = 0.894$). These findings provide initial support for H1–H3.

Multiple linear regression

Table 5. Multiple regression predicting consumer purchase decision.

Predictor	B	SE	β	t	p
Constant	0.138	0.078	-	1.757	0.080
Perceived Diagnosticity	0.249	0.056	0.254	4.452	<0.001
Perceived Usefulness	0.488	0.048	0.484	10.213	<0.001
Consumer Perception	0.220	0.055	0.221	3.963	<0.001

The regression model was statistically significant, $F(3, 380) = 826.413$, $p < 0.001$. The model produced $R = 0.931$, $R^2 = 0.867$ and adjusted $R^2 = 0.866$, indicating that perceived diagnosticity, perceived usefulness and consumer perception jointly explained 86.7% of the variance in consumer purchase decision. Perceived usefulness was the strongest predictor ($\beta = 0.484$, $t = 10.213$, $p < 0.001$), followed by perceived diagnosticity ($\beta = 0.254$, $t = 4.452$, $p < 0.001$) and consumer perception ($\beta = 0.221$, $t = 3.963$, $p < 0.001$).

Table 6. Hypothesis testing.

Hypothesis	Relationship	Result
H1	Perceived Diagnosticity → Consumer Purchase Decision	Supported ($p < 0.001$)
H2	Perceived Usefulness → Consumer Purchase Decision	Supported ($p < 0.001$)
H3	Consumer Perception → Consumer Purchase Decision	Supported ($p < 0.001$)

DISCUSSION

Perceived diagnosticity and purchase decision

The findings support H1 and demonstrate that perceived diagnosticity is a significant positive predictor of consumer purchase decision. The result indicates that consumers are more likely to proceed with a cosmetic purchase when VTO provides useful information for judging product appearance and suitability. This is consistent with the role of richer product presentation in improving online product understanding and reducing uncertainty Beck and Crié (2018) and Hilken et al. (2022). For cosmetics, where colour, shade and visual appearance are difficult to evaluate through static product images alone, diagnostic information provided by VTO can strengthen decision confidence.

Perceived usefulness and purchase decision

H2 received the strongest empirical support in the study. Perceived usefulness had the largest standardised coefficient ($\beta = 0.484$), indicating that consumers' belief that VTO helps them make decisions, save time and improve their shopping experience is particularly important. This finding is closely aligned with TAM, in which perceived usefulness represents a central mechanism through which technology provides instrumental value to users Davis (1989). The result also extends the practical interpretation of VTO beyond novelty or entertainment: consumers appear to value the technology when it performs a meaningful decision-support function.

Consumer perception and purchase decision

H3 was also supported, indicating that favourable consumer perceptions of VTO contribute to purchase decision. The construct includes confidence, comfort, trustworthiness and overall impressions of online cosmetic shopping. Interactive and immersive retail technologies can strengthen customer engagement by creating more experiential and informative shopping environments Cruz-Cárdenas et al. (2019) and Krejcie and Morgan (1970). The positive regression coefficient suggests that consumers who feel more confident and comfortable using VTO are more inclined to purchase cosmetics online.

Theoretical and practical implications

Theoretically, the findings reinforce the relevance of TAM-based reasoning to VTO-enabled consumer behaviour by demonstrating the strong role of perceived usefulness in purchase-related outcomes. The results also show that diagnostic information and overall consumer perceptions complement usefulness in explaining purchase decisions. The high explanatory power of the model ($R^2 = 0.867$) suggests that these VTO-related evaluations are collectively important within the studied context.

From a managerial perspective, cosmetic brands and e-commerce platforms should prioritise VTO accuracy, usability and credibility rather than treating VTO solely as an engagement feature. Product simulations should provide realistic shade and appearance representations across different skin tones and facial features, while interfaces should minimise unnecessary steps and technical friction. Because perceived usefulness was the strongest predictor, marketers should explicitly communicate functional benefits such as faster product selection, improved product assessment and greater confidence before purchase. Platforms can also use social media and digital campaigns to demonstrate how VTO supports informed cosmetic decisions.

CONCLUSION

This study provides empirical evidence that perceived diagnosticity, perceived usefulness and consumer perception significantly influence consumer purchase decision in VTO-enabled online cosmetics shopping. All three hypotheses were supported at $p < 0.001$. Among the predictors, perceived usefulness emerged as the strongest determinant, followed by perceived diagnosticity and consumer perception. The findings indicate that consumers are more likely to purchase cosmetics when VTO is perceived as useful, informative and trustworthy.

Several limitations should be considered when interpreting the findings. The use of convenience sampling limits generalisability, while the cross-sectional design does not establish causal relationships. The geographic focus on Melaka also limits transferability to other Malaysian states and international markets. In addition, the study relies on self-reported online responses and focuses only on cosmetics. Future research could employ probability sampling, longitudinal or experimental designs, broader geographical coverage and additional product categories. Future models could also examine variables such as perceived risk, brand trust, technology readiness, enjoyment or attitudes towards augmented reality.

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REFERENCES

1. Ahn, T., Ryu, S., & Han, I. (2007). The impact of Web quality and playfulness on user acceptance of online retailing. *Information & Management*, 44(3), 263–275. <https://doi.org/10.1016/j.im.2006.12.008>
2. Baytar, F., Chung, T.-L. D., & Shin, E. (2016). Can augmented reality help e-shoppers make informed purchases on apparel fit, size, and product performance. *International Textile and Apparel Association Annual Conference Proceedings*, 73(1), 1–2. https://doi.org/10.31274/itaa_proceedings-180814-1385
3. Beck, M., & Crié, D. (2018). I virtually try it... I want it! Virtual Fitting Room: A tool to increase online and offline exploratory behavior, patronage, and purchase intentions. *Journal of Retailing and Consumer Services*, 40, 279–286. <https://doi.org/10.1016/j.jretconser.2016.08.006>
4. Chylinski, M., Heller, J., Hilken, T., Keeling, D. I., Mahr, D., & de Ruyter, K. (2020). Augmented reality marketing: A technology-enabled approach to situated customer experience. *Australasian Marketing Journal*, 28(4), 374–384. <https://doi.org/10.1016/j.ausmj.2020.04.004>
5. Cohoon, J., & Oluoma, N. (2013). The role of virtual try-on technology in online purchase decision from consumers' aspect. *Internet Research*, 29(4), 803–825. <https://doi.org/10.1108/INTR-05-2018-0211>
6. Costa, R. L. d., Cavalheiro, I., Gonçalves, R., Dias, Á., Silva, R. V. d., & Pereira, L. (2022). The influence of artificial intelligence on online behavior. *International Journal of Services Operations and Informatics*, 12(2), 119–143.
7. Cruz-Cárdenas, J., Zabelina, E., Deyneka, O., Guadalupe-Lanas, J., & Velín-Fárez, M. (2019). Role of demographic factors, attitudes toward technology, and cultural values in the prediction of technology-based consumer behaviors: A study in developing and emerging countries. *Technological Forecasting and Social Change*, 149, 119768. <https://doi.org/10.1016/j.techfore.2019.119768>
8. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
9. Heller, J., Chylinski, M., de Ruyter, K., Mahr, D., & Keeling, D. I. (2019). Let me imagine that for you: Transforming the retail frontline through augmenting customer mental imagery ability. *Journal of Retailing*, 95(2), 94–114. <https://doi.org/10.1016/j.jretai.2019.03.005>
10. Hilken, T., Chylinski, M., Keeling, D. I., Heller, J., de Ruyter, K., & Mahr, D. (2022). How to strategically choose or combine augmented and virtual reality for improved online experiential retailing. *Psychology & Marketing*, 39(3), 495–507. <https://doi.org/10.1002/mar.21600>
11. Hoffmann, S., & Mai, R. (2022). Consumer behavior in augmented shopping reality: A review, synthesis, and research agenda. *Frontiers in Virtual Reality*, 3, 10–16. <https://doi.org/10.3389/frvir.2022.961236>
12. Hua, W., Liu, Y., Zhang, Z., Li, M., & Yu, X. (2024). Exploring users' adoption intention of virtual try-on apps: How users' individual characteristics affect post-use feelings. *Asia Pacific Journal of Marketing and Logistics*, 490–503. <https://doi.org/10.1108/APJML-09-2023-0920>
13. Jiang, Z., & Benbasat, I. (2007). The effects of presentation formats and task complexity on online consumers' product understanding. *MIS Quarterly*, 31(3), 475–500.
14. Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610. <https://doi.org/10.1177/001316447003000308>
15. Sung, E.-C., Bae, S., Han, D. I. D., & Kwon, O. (2021). Consumer engagement via interactive artificial intelligence and mixed reality. *International Journal of Information Management*, 60, Article 102382. <https://doi.org/10.1016/j.jinfomgt.2021.102382>
16. Wedel, M., Bigné, E., & Zhang, J. (2020). Virtual and augmented reality: Advancing research in consumer marketing. *International Journal of Research in Marketing*, 37(3), 443–465. <https://doi.org/10.1016/j.ijresmar.2020.04.004>
17. Zhang, M., & Luo, L. (2023). Can fashion influencers convince consumers? The impact of virtual influencers on fashion consumption. *Journal of Business Research*, 154, Article 113342. <https://doi.org/10.1016/j.jbusres.2022.113342>

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18. Zhang, Y., Ahmad, A., Azman, N., & Wei, M. (2023). The effect of perceived usefulness, perceived ease of use, and social influence toward purchase intention mediated by trust in live streaming platform. *Journal of Law and Sustainable Development*, 11(9), e1284. <https://doi.org/10.55908/sdgs.v11i9.1284>