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IMPACT OF AI-POWERED PERSONALIZATION ON CONSUMER ENGAGEMENT IN LUXURY COSMETICS E-TAILING

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ABSTRACT

Artificial Intelligence (AI) is increasingly revolutionizing the online retail of luxury cosmetics by facilitating customized product suggestions and tech-enhanced shopping experiences that cater to the specific preferences of individual consumers. This research investigates how AI-driven personalization affects consumer engagement within the luxury cosmetics e-tailing sector. A quantitative research methodology was utilized, with primary data gathered using a structured questionnaire from consumers who have purchased premium or luxury cosmetics online and have experienced AI-powered personalized features. The final analysis included 89 valid and complete responses. For data analysis, descriptive statistics, reliability analysis, Pearson correlation, and simple linear regression were applied. The results showed that AI-powered personalization and customer engagement had a favorable and statistically significant link ($r = 0.492$, $p < 0.001$). Additionally, regression research revealed that 24.2% of the variance in customer engagement was explained by AI-powered personalization ($R^2 = 0.242$). The results offer useful implications for luxury cosmetics e-tailers looking to improve client interactions through personalization and emphasize the significance of relevant and customized AI-enabled shopping experiences in boosting consumer engagement.

KEYWORDS: Artificial Intelligence, AI-Powered Personalization, Consumer Engagement, Luxury Cosmetics, E-Tailing, Personalized Recommendations

1. INTRODUCTION

A key technological factor in the evolution of electronic retailing is artificial intelligence (AI). E-tailers may offer more personalized shopping experiences because to AI systems' capacity to analyze customer preferences, browsing patterns, past purchases, and interactions. Recommendation engines driven by AI and other personalization technologies enable online businesses to transcend conventional marketing strategies and offer product recommendations and exchanges that are more

pertinent to certain customers. As a result, recent studies on digital commerce have emphasized AI-enabled technologies and personalization as crucial processes linked to customer experience and engagement (Bilal et al., 2024; Teepapal, 2025). The use of AI is especially pertinent to the beauty and cosmetics sector, where product choices can be influenced by human preferences and traits including skin type, skin tone, shade, product appropriateness, and personal beauty standards. AI-enabled solutions can help customers in an online setting with augmented reality, virtual try-on facilities, personalized product recommendations, and other tech-assisted experiences. While Adawiyah et al. (2024) investigated the integration of AI and augmented reality in personalized cosmetics recommendations, Chakraborty et al. (2024) showed the increasing importance of AI-enabled technologies and virtual trial experiences in beauty and cosmetics purchasing.

These features are especially crucial for online retailers of high-end cosmetics. In addition to functional product requirements, luxury and premium cosmetics purchases incorporate consumers' expectations about the quality and relevance of their purchasing experiences. Customized recommendations and technology-assisted product evaluation can help customers find alternatives that more closely match their specific needs because physical product inspection is limited in e-tailing. AI and AR-enabled technologies can enable individualized product evaluation and impact consumers' reactions to digital buying experiences, according to research on online cosmetics shopping (Adawiyah et al., 2024; Chakraborty et al., 2024).

The more general digital marketing procedures of segmentation and targeting are intimately linked to AI-powered personalization. AI-enabled solutions can allow more customized interactions and recommendations by utilizing customer data and behavioral trends. The consumer-facing expression of these capabilities is personalization, in which aspects of the online purchasing experience are tailored to the tastes and past interactions of the user. The significance of relevance, perceived utility, trust, and privacy considerations in influencing consumers' reactions to tailored digital experiences has been emphasized by research on AI-driven customization (Teepapal, 2025).

Customer engagement is a crucial reaction to AI-enabled digital experiences. Customers' interest in interacting with AI-enabled features, their attention to tailored recommendations, and their participation in the personalized purchasing experience are all indicators of engagement in the current study. AI-enabled interactions and consumer engagement in digital shopping environments have been shown to be significantly correlated by prior empirical study (Bilal et al., 2024). The relevance of AI affordances and virtual trial experiences to customers' desire to interact with AI-assisted beauty purchase technologies is also demonstrated by research in the beauty and cosmetics industry (Chakraborty et al., 2024).

Although AI is increasingly applied in digital commerce, the relationship between AI-powered personalization and consumer engagement requires further investigation within luxury cosmetics e-tailing. Prior studies have explored AI-enabled consumer interactions, virtual trial experiences, augmented reality, personalized recommendations, and broader AI-driven personalization in beauty, e-commerce, and social-media contexts (Adawiyah et al., 2024; Bilal et al., 2024; Chakraborty et al., 2024; Teepapal, 2025). Nevertheless, empirical research specifically addressing consumers' perceptions of AI-powered personalization and its impact on consumer engagement in luxury cosmetics e-tailing remains limited.

In light of this, the current study investigates the connection between consumer involvement in luxury cosmetics e-tailing and AI-powered customisation. It specifically looks into whether customers are more engaged with their online cosmetics shopping experience when they perceive higher levels of AI-enabled personalization. By concentrating on this relationship, the study offers consumer-focused insights into customized digital experiences in luxury beauty e-commerce and adds to the larger body of research on AI-enabled personalization.

2. REVIEW OF LITERATURE

Chakraborty et al. (2024) explored the potential of leveraging AI to enhance user engagement in cosmetic and beauty product purchases. The study was conducted using mixed method approach based on the quantitative data collected from 866 users and 177 user testimonials. The authors explored how virtual trial experience moderates and developed an AI affordance paradigm. The results showed that the perceived relative advantage and AI compatibility had a significant effect on consumers' perception of AI affordances. The virtual try-on experience, however, boosted the customers' desire to purchase AI-powered beauty and cosmetic products. The report shows the beauty and cosmetics industry's experience with the use of AI-powered innovations for customer interactions. In the study of "Application of Artificial Intelligence (AI) and Augmented Reality (AR) for Cosmetic Product Recommendations Based on User Segmentation on the Shopee Online Platform" conducted by Adawiyah et al. (2024), the researchers investigated how AI and AR could be used to suggest cosmetics that match the individual preferences of consumers. Partial least squares (PLS) with structural equation modeling (SEM) was used as the quantitative investigation method in this study, involving 387 respondents. The study was based on Theory of Planned Behavior and Technology Acceptance Model, and the factors impacting the acceptance of personalized recommendations by consumers were found to be perceived usefulness, perceived simplicity of use, and perceived trust. The results show that the use of virtual try-on technology and system recommendation using AI has the potential to improve the user experience of purchasing cosmetics online and aid in the evaluation of cosmetics. Bilal et al. (2024) explored the relationship between AI, consumer engagement, consumer experience and purchase intent. An online survey was conducted to collect the data from

467 social media users in China with online purchasing experience and experience using AI technologies, and the proposed relationships were tested using PLS-SEM. The results showed that AI helped benefit the consumer experience and consumer engagement in a positive way. Study also revealed that engagement and consumer experience influenced the consumer satisfaction and purchase intention. The study offers empirical findings on the potential of AI-driven interactions to enhance engagement and drive positive consumer interactions in digital buying scenarios. In the context of Retail 4.0, Behera et al. (2024) discussed the application of AI-based e-marketing from e-retailer point of view for transforming the customer engagement in e-retail environment. Primary data were gathered from a sample of 305 customers of e-retailers and the data were quantitatively processed. The study underscored the critical importance of the new e-marketing capabilities powered by AI to bring together consumer data and digital technologies to boost customer engagement. The results highlight the growing role of AI-powered marketing tools in meeting customer needs and creating more consumer-centric interactions in the electronic retailing landscape. To understand the perception of personalization via AI and how it affects social media marketing engagement, Teepapal (2025) studied consumer perception. Based on the Stimulus–Organism–Response model, the study explored the relationships between AI-powered personalization, trust, privacy concerns, perceived usefulness, and consumer engagement via Structural Equation Modelling (SEM). The results showed that the use of AI personalization had a positive effect on trust and perceived usefulness, which in turn, had a positive impact on consumer engagement. But AI personalization didn't lead to a significant direct impact on engagement. The study thus shows that the personalisation effect might not be a direct effect but a psychological perception effect as well.

In the context of the Indian online-shopping market, Jayapal (2025) explored how AI personalization affects customer loyalty emphasizing the privacy issues. The study combined Stimulus – Organism – Response with Relationship Marketing theory, and investigated personalized recommendations and personalized interactions in terms of trust, engagement, satisfaction, perceived value and loyalty. The results showed that AI personalisation had no direct impact on loyalty, but instead acted as a catalyst for various factors such as trust and engagement. Some of these positive effects were dampened by greater privacy concerns. The study is significant, as it sets the ground for the impact of consumer engagement in the context of AI-based personalization in Indian e-commerce.

Lang and Saragih (2025) examined how varying degrees of AI personalization might impact customer engagement within the eCommerce realm, with privacy concerns factored in. A questionnaire was developed and the required data was gathered from 258 e-commerce users and analysed through PLS-SEM. Product recommendations, AI-driven customer service, and automatic personalized promotions were examples of AI for personalization. The results showed that while product recommendations and AI-driven customer service did not show significant effects, automated personalized promotions

significantly improved customer engagement. All of this suggests that the type of AI personalization can lead to different consumer-engagement results.

To evaluate the effectiveness of AI-recommended personalization on click behavior in China's e-commerce market, Yin et al. (2025) examined how such experiences may influence consumers' intent to click. This research was conducted in three studies. In the first, in-depth interviews were conducted with 30 consumers, and in the second, reliability and validity of developed scale was tested by using 347 valid questionnaires and in the third, proposed model was tested by using 1,097 valid questionnaires. The results revealed that relevance, inspiration and interesting events surrounding the AI personalized recommendations were indeed strong drivers for click intention through the pathway of immersive experience and technology acceptance. The study also revealed that some of the positive effects could be diminished by the perception of information-privacy infringement.

Hassan et al. (2025) explored how personalized recommendations influence the connection between trust, satisfaction, and loyalty in the context of AI driven e-commerce. The study was conducted with a quantitative method with consumers who have experience with AI-based recommendation systems and employed by using the SEM method. 729 of the 786 responses collected were retained for the final analysis. It was found that the model explained the phenomenon well, as there was a significant relationship between trust, satisfaction, and loyalty, and personalization increased the explanatory power of the model. The study shows that customized AI suggestions can have an impact on key consumer relationship outcomes, and highlights the need to create recommendation systems as users might view them as reliable and helpful.

Akisanmi et al. (2025) analyzed the role of artificial intelligence personalisation, customer engagement and conversion in e-commerce business in Nigeria. For quantitative data collection, 400 online shoppers were selected and descriptive statistics, correlation and regression analysis were used. The results indicated that the personalization based on AI could be a powerful driver of consumer engagement and purchase intent, especially when it felt relevant and timely. In addition, consumer engagement was found to be an important link in the personalization-purchase behaviour nexus. Some of the benefits were mitigated by privacy concerns, however, and this is a necessary balance between personalization and responsible data practices.

The study by Thulasi Priya et al. (2025) explores the role of AI in personalizing content and how this influences consumer engagement and brand loyalty. The study was conducted on 60 respondents in Coimbatore district with the help of primary data gathered by using structured questionnaire. The study was directed towards the potential of AI personalisation to generate contextually relevant, individualised content experiences and its impact on engagement and brand loyalty. The study is

relevant to the current study, as it extends evidence of personalization and consumer engagement using AI to the Indian context and shows the increasing use of personalization beyond the traditional product-recommendation type applications.

The effects of AI personalization on consumer engagement within the UAE e-commerce industry have been explored by Masoud and Kumar (2026). The survey was carried out by a quantitative cross-sectional survey of 396 online consumers. Five personalization techniques were analyzed: Personalized product recommendation, Targeted advertisement, Personalized email campaign, Behavioural tracking, Perceived relevance. The findings indicated that the sum of the personalization strategies accounted for 54.9 per cent of the variance in consumer engagement with the results, with perceived relevance being the most important predictor. The results offer new empirical evidence on how AI-driven personalization can enhance consumer engagement when the personalized content is relevant and valuable. The literature reviewed shows that AI-based personalization can impact consumer interactions, technology acceptance, clicking behaviour, trust, satisfaction, purchase intention, loyalty, and other consumer responses in digital commerce. The beauty and cosmetics industry has been a special focus of AI affordances, virtual trials, augmented reality, and personalized recommendations, while e-commerce research has concentrated on recommendation systems, personalized promotions, relevance, privacy, trust, and engagement. There are also some indications in the literature that the impact of personalization is not always desirable, as the trust, perceived usefulness, privacy concerns and the nature and relevance of personalization may affect consumer outcomes. Although the emerging research, targeted empirical studies on the direct link between AI-powered personalization and consumer engagement in an e-commerce context of luxury cosmetics are still relatively scarce. This is the basis for the current study.

3. RESEARCH GAP

Previous research has clearly shown the significant impact of Artificial Intelligence (AI) on improving consumer experiences in both e-commerce and digital marketing contexts. AI-driven personalization has been studied in various areas such as personalized product recommendations, automated promotions, virtual try-on, augmented reality, behavioural tracking, and AI-assisted customer interactions. Several studies have also shown consumers' responses (e.g., engagement, trust, satisfaction, click, purchase intention, and loyalty) to AI-driven personalization. In the beauty and cosmetics industry, AI capabilities have garnered special attention in the areas of virtual try-on effects, technology acceptance, personalised cosmetic suggestions, and AI affordances. There are, however, a number of lacunas in the literature. In the first place, a lot of the empirical evidence for the use of AI-based personalization and consumer engagement has been built in a generic e-commerce, social media, and content-marketing scenario, and not specifically in luxury cosmetics e-tailing. Second, while existing beauty and cosmetics research has explored AI-driven product discovery, augmented reality,

and AI virtual try-on, relatively less focus has been placed on consumers' perception of the entire experience of AI-driven personalization and its connection to consumer engagement within the online luxury cosmetics context. Thirdly, the studies already conducted have been across diverse geographical environments, such as China, UAE and Nigeria and the empirical evidence on this relationship in the Indian luxury cosmetics e-tailing context is limited. Besides, luxury cosmetics are unique online retail context as consumer choices of product are determined by their preferences and requirements – skin type, color, product suitability, beauty needs – and consumers may have a different shopping experience expectation from luxury and premium products. Therefore, the results obtained from the general e-commerce context might not completely capture the reactions of consumers to personalisation using AI in luxury cosmetics e-tailing. The present study aims to fill these gaps by examining the impact of the usage of AI-based personalization elements on consumer engagement for luxury cosmetics e-tailing, focusing on consumers who have experienced AI or personalized content during their luxury or premium cosmetics purchases online. The study is further focused on the impact of AI-driven personalisation on consumer response in luxury beauty ecommerce, thereby showcasing a specific subset of the relationship between personalisation and consumer engagement.

4. OBJECTIVES OF THE STUDY

This research is set to investigate the impact of personalization through AI on consumer engagement in e-tailing luxury cosmetics. Specific aims of the study are:

- i) To analyse the demographic profile and online cosmetics purchase behaviour of the luxury cosmetics consumers.
- ii) To evaluate customers' attitude towards personalisation aspect in luxury cosmetics e-tailing using Artificial Intelligence.
- iii) To evaluate the level of consumer engagement with AI-enabled personalized experiences in luxury cosmetics e-tailing.
- iv) To analyze the effects of personalization through AI on consumer involvement with luxury cosmetics e-tailing.

5. HYPOTHESES OF THE STUDY

The following hypotheses are developed based on the study's aims and the hypothesized consumer-AI personalization relationship:

H₀: There is no significant relationship between AI-powered personalization and consumer engagement in luxury cosmetics e-tailing.

H₁: There is a significant positive relationship between AI-powered personalization and consumer engagement in luxury cosmetics e-tailing.

6. CONCEPTUAL FRAMEWORK

Based on the conceptual framework of the study, it is hypothesized that the use of AI-based personalization will have an impact on consumer involvement in the e-tailing process for luxury cosmetics. Independent variables are regarded as AI-powered personalisation, which involves consumers' perception of personalised product recommendations, relevant recommendations, preference-based suggestions, AI-powered product assistance, try-on, shade matching, skin analysis and other personalised online shopping experiences. The dependent variable is 'Consumer Engagement' which is the level of attention, interest and interaction consumers have with AI-enhanced personalized shopping experiences. The conceptual framework was developed through literature review and research objectives, which showed the positive correlation between using AI in the personalization of the shopping experience and its role in engaging consumers in luxury cosmetics e-tailing.

Figure 1: Conceptual Framework of the Study



Source: Developed by the researchers based on the review of literature.

7. RESEARCH METHODOLOGY

In this study, the method used is quantitative research approach with descriptive and analytical research design. Data collected from primary sources were gathered from a structured questionnaire which was used using Google Forms. The target audience comprised consumers aged 18+, who have purchased luxurious/premium cosmetics/beauty products online and encountered AI-powered/personalized features when shopping for cosmetics online. These features consisted of product suggestions, virtual try-on, skin analysis, shade matching, virtual beauty assistants, and past suggestions for a search or purchase. The samples were taken using a purposive sampling method, meaning that the respondents needed to have an online shopping experience with cosmetics products and an AI-personalization experience that was relevant.

During the data collection, 306 responses were received. In order for an answer to be included in the study, it had to meet the following pre-screening criteria: age 18 years or older; purchase of premium or luxury cosmetics on the internet; relevant experience with AI-enabled or personalized features in their online shopping; answering all key measurement items. A total of 89 responses (N = 89) were

screened and included in the final statistical analysis as eligible and complete responses. The questionnaire comprised screening questions, questions regarding online cosmetics purchase behaviour and online usage of AI features, demographic questions, and statements to measure the two constructs of the study. AI-powered personalization was the independent variable in this study, measured using eight statements: Recommending products based on personalization, relevance to personal beauty needs, preference-based suggestions, assistance with products created by AI, virtual try-on and relevant features, understanding of consumers' preferences, ease of product selection and overall personalized shopping experience. The dependent variable was consumer engagement which was assessed by three statements regarding attention to personalized recommendations, interest in interacting with AI-enabled functionality, and how personalization using AI made online cosmetics shopping more interesting. The statements were numbered 1 (Strongly Disagree) to 5 (Strongly Agree) and were constructed. Descriptive and inferential statistical techniques were used to analyse the collected data. Descriptive statistics were used to represent the demographic profile and the purchasing characteristic over the internet of the respondents by means of frequencies and percentages. The concepts of mean and standard deviation were used to assess the consumers' perception towards AI-powered personalization and the level of consumer engagement. Cronbach's alpha was used to assess internal consistency of the measurement items. Pearson's correlation analysis was conducted to investigate the correlation between AI-powered personalisation and consumer engagement and simple linear regression analysis was used to analyse the predictive association between AI-powered personalisation and consumer engagement. Statistically significant was the result with a value of 5 per cent or less ($p < 0.05$).

8. RESULTS AND DISCUSSION

Descriptive and inferential statistical approaches were used to analyze the data obtained from the eligible respondents in the present study as per the objective of the study. 89 complete responses were eligible for the final analysis. The results are discussed in terms of: Demographic and online purchasing characteristics of respondents, Descriptive statistics of the study variables, Reliability analysis, Correlation analysis and Regression analysis.

8.1 Demographic Profile and Online Purchasing Characteristics

Table 1. Demographic Profile and Online Purchasing Characteristics of Respondents (N = 89)

Characteristic	Category	Frequency	Percentage
Gender	Female	59	66.3
	Male	21	23.6
	Prefer not to say	7	7.9
	Other	2	2.2
Age	18–25 years	30	33.7
	26–35 years	29	32.6
	36–45 years	13	14.6
	46–55 years	10	11.2
	Above 55 years	7	7.9
Educational Qualification	Higher Secondary	7	7.9
	Undergraduate	33	37.1
	Postgraduate	21	23.6
	Professional Qualification	14	15.7
	Doctorate	6	6.7
	Other	8	9.0
Occupation	Student	23	25.8
	Private-sector employee	25	28.1
	Government employee	9	10.1
	Business/Self-employed	17	19.1
	Homemaker	8	9.0
	Other	7	7.9
Monthly Personal Income	Below ₹25,000	17	19.1
	₹25,001–₹50,000	19	21.3
	₹50,001–₹75,000	8	9.0
	₹75,001–₹1,00,000	18	20.2
	Above ₹1,00,000	11	12.4

	Prefer not to say	16	18.0
Online Cosmetics Purchase Frequency	Less than once every 6 months	24	27.0
	Once every 3–6 months	14	15.7
	Once every 1–2 months	24	27.0
	2–3 times per month	13	14.6
	More than 3 times per month	14	15.7

The demographics and online purchasing traits of the respondents are given in Table 1. The sample comprised mainly female (66.3%) and male (23.6%) genetic sex. The genetic sex of the sample was predominantly female (66.3%) and male (23.6%). The greatest proportions of respondents were in the 18-25 year age group (33.7%) and 26-35 years (32.6%). The majority of the respondents were undergraduate students (37.1%) followed by the post graduate students (23.6%). The largest group of respondents were those who work in the private sector (28.1%), followed by students (25.8%). When asked about their frequency of cosmetic purchases online, 27.0% said they bought cosmetics once a month or every 1–2 months and 27.0% said less than once per six months. As a whole, the sample comprised consumers with a wide spectrum of demographic and purchasing characteristics that were suitable for the study.

8.2 Descriptive Statistics of the Study Variables

Table 2. Descriptive Statistics of AI-Powered Personalization and Consumer Engagement (N = 89)

Study Variable	No. of Items	Mean	Standard Deviation
AI-Powered Personalization	8	3.692	0.495
Consumer Engagement	3	3.685	0.682

Interpretation

Table 2 gives the descriptive statistics for the major variables studied. The mean score for AI-powered personalization is 3.692, which reflects a moderately positive perception of the AI-enabled personalized experiences in luxury cosmetics e-tailing. The mean score for consumer engagement was

3.685, indicating a moderate level of consumers' attention, interest, and interactions with personalized shopping experiences powered by AI. Overall, the findings suggest a positive attitude towards the value of using AI-driven personalization and consumer engagement.

8.3 Reliability Analysis

To measure the internal consistency of the items included in measuring AI-powered personalisation and consumer engagement, Cronbach's alpha was applied and used to test the reliability of the measurement scales.

Table 3. Reliability Analysis of the Study Variables

Construct	No. of Items	Cronbach's Alpha (α)
AI-Powered Personalization	8	0.638
Consumer Engagement	3	0.505

Interpretation

The reliability coefficients for the items of the study variables are presented in Table 3. The Cronbach's alpha for the eight items of the AI-powered personalization scale was 0.638, which is considered as moderate internal consistency. The three item consumer engagement scale had a Cronbach's alpha of 0.505, which is relatively low. Thus, the results concerning consumer engagement need to be considered with some caution. This lower level of reliability could perhaps be due to the fewer number of items used to measure consumer engagement in the present study. A wider and independently validated multi-item scale could be used in future research to enhance the construct measurement.

8.4 Correlation Analysis

A Pearson correlation analysis was performed to analyze the relationship between the AI-based personalization and the engagement of consumer in luxury cosmetics e-tailing.

Table 4. Correlation between AI-Powered Personalization and Consumer Engagement (N = 89)

Variables	AI-Powered Personalization	Consumer Engagement
AI-Powered Personalization	1.000	0.492*
Consumer Engagement	0.492*	1.000

*p < 0.001

Interpretation

The results in Table 4 indicate that there was a positive and statistically-significant relationship between AI-powered personalisation and consumer engagement ($r = 0.492$, $p < 0.001$). The positive correlation suggests that the more consumers feel they are being personalized by AI, the more engaged they are with the company, as revealed by the respondents. Moderate positive relationship between the two variables is shown by the magnitude of the correlation. The findings indicate that consumers who feel that the online luxury cosmetics platforms offer more relevant and individual AI-driven experiences are more likely to report increased attention, interest and interaction in such personalized shopping experiences. This study utilizes cross-sectional survey data, however, the correlations made should be interpreted as an association rather than causative.

8.5 Regression Analysis

A simple linear regression analysis was used to analyze the predictive relationship between AI-powered personalization and consumer engagement in luxury cosmetics e-tailing.

Table 5. Simple Linear Regression Analysis

Predictor	B	t-value	p-value	R ²
AI-Powered Personalization	0.678	5.265	< 0.001	0.242

**Dependent
N = 89**

Variable:

Consumer

Engagement

Interpretation

As seen in Table 5, the personalization feature of AI is a positive and statistically significant predictor of consumer engagement ($B = 0.678$, $t = 5.265$, $p < 0.001$). The coefficient of determination ($R^2 = 0.242$) explains that about 24.2% of the variance in consumer engagement among the respondents used for the study is accounted for by the AI-based personalization. A positive regression coefficient means that consumer engagement increases with the increase in perceived AI-powered personalisation. This one-predictor model accounts for only 75.8% of the variance, leaving the variance unaccounted for that could be related to other factors not measured in this study. Because of the cross sectional design, the regression result should be viewed as a predictive statistical relationship, rather than as proof of causation.

8.6 Hypothesis Testing

The hypothesis of the study was tested based on the results of the simple linear regression analysis.

Table 6. Hypothesis Testing

Hypothesis	Statement	p-value	Decision
H ₀	AI-powered personalization has no significant impact on consumer engagement in luxury cosmetics e-tailing.	< 0.001	Rejected
H ₁	AI-powered personalization has a significant positive impact on consumer engagement in luxury cosmetics e-tailing.	< 0.001	Supported

Interpretation

The regression analysis results showed that there was a positive relationship between AI-based personalization and consumer engagement that was statistically significant ($B = 0.678$, $t = 5.265$, $p < 0.001$). The p-value is less than the significance level of 0.05, so the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. The results suggest that perceived level of personalization using AI has a significant relationship with consumer engagement in the e-tailing of luxury cosmetics. The study, however, uses a cross sectional research design and should not be considered as conclusive evidence of a causal effect.

8.7 Discussion of Findings

The current study revealed that AI-powered personalization had a positive and statistically significant correlation with consumer engagement for luxury cosmetics e-tailing. The Pearson correlation coefficient ($r = 0.492$, $p < 0.001$) shows that the two constructs are moderately positively associated. The regression analysis also showed that the AI-enabled personalization was a strong positive predictor of consumer engagement ($B = 0.678$, $t = 5.265$, $p < 0.001$) and explained 24.2% of the variance in consumer engagement ($R^2 = 0.242$).

The results are similar to Bilal et al. (2024) who found that AI improved the consumer experience and consumer engagement for online consumers. The study of 467 Chinese social-media users who have made online purchases and who have interacted with AI, offers supporting evidence that such interactions could play a part in building consumer engagement in digital environments.

The findings also apply to Chakraborty et al. (2024), who studied 177 user statements and quantitative data collected from 866 users with respect to AI-powered technologies in beauty and cosmetics. The study they conducted highlighted that AI compatibility, relative advantage, and virtual trial experiences play a crucial role in consumers' decision to make purchases in the beauty and cosmetics sector using AI. This helps to underscore the importance of studying personalised experiences enabled by AI and its applications in the beauty and cosmetics industry.

Likewise, Adawiyah et al. (2024) conducted a study on the impact of AI and AR features in personalized cosmetics recommendations on Shopee with 387 respondents. They observed their findings to show that perceived usefulness, ease of use, and trust have significant influences on consumers' intention to use personalized recommendations. While the dependent variable in their study was not consumer engagement, the findings do highlight the significance of personalization in online cosmetics purchases powered by AI.

The findings of the present study are also in line with those of Yin et al. (2025) who reported that

relevance, inspiration, and helpful experiences of AI-recommended products had a strong positive influence on consumers' clicking intention in Chinese e-commerce. Their results particularly emphasize the importance of relevance in determining consumer responses to personalized recommendations. Similarly, Hassan et al. (2025) showed that personalisation can have a significant impact on consumer responses, such as building trust, satisfaction, and loyalty, which also highlights the value of personalised recommendations in e-commerce. But the results from a review of past studies do not consistently find a direct link between engagement and AI personalization.

In the context of social media, Teepapal (2025) reported that AI personalization does not have a statistically significant direct effect on the engagement of consumers. Rather, trust and perceived usefulness mediated these relationships. In the same way, the study by Lang and Saragih (2025) showed that the use of automated personalized promotions significantly improved customer engagement, while the personalized product recommendations and AI-driven customer service did not have significant impacts. The results suggest that personalization effectiveness could vary depending on the type of personalization mechanism and consumers' perception of the personalization mechanism.

Recent studies by Masoud and Kumar (2026) further reinforce the importance of personalization in consumer engagement through AI. They discovered that five dimensions of AI personalisation accounted for 54.9% of the variance in consumer engagement in their research of 396 UAE online consumers, the strongest of which was perceived relevance. The explanatory power of their multidimensional model was higher than the 24.2% shown in this study of one predictor model, but the two studies are not directly comparable due to differences in constructs, samples, contexts and model specification. In conclusion, the results reported here add to the literature, with an important relationship between AI-powered personalization and the consumer engagement in luxury cosmetics e-tailing established. Concurrently, the results of previous research indicate that the role of personalization is not the same in all digital spaces. The impact of consumers could be shaped by factors like relevance, usefulness, trust, privacy concerns, and the specific nature of the AI-driven personalization. The present results then confirm the importance of personalisation tools based on AI for consumer engagement, and also suggest the need for wider models that take into account more consumer and technology related factors.

9. MAJOR FINDINGS AND MANAGERIAL IMPLICATIONS

9.1 Major Findings

The study involved examining the relation between AI personalization and consumer engagement in e-tailing of luxury cosmetics, with 89 respondents eligible. The following are the main conclusions of the study:

1. The overall mean score for respondents' attitudes toward AI-driven personalization was 3.692, reflecting a positive attitude. This suggests a positive opinion of the respondents toward personalized recommendations and AI-powered features in shopping.
2. The overall mean score for consumer engagement was 3.685, suggesting that the participants had a generally positive engagement with the AI-powered personalized shopping experiences.
3. The results of Pearson's correlation analysis showed a moderate positive relation with $p\text{-value} < 0.001$ for AI powered personalisation and consumer engagement.
4. The simple linear regression analysis results indicated that AI-driven personalization was a significant positive predictor of the consumer engagement ($B = 0.678$, $t = 5.265$, $p < 0.001$).
5. The model's ability to power personalization with AI explained 24.2% of consumer engagement ($R^2 = 0.242$). This suggests that personalization matters to engagement; and that there is significant variation in consumer engagement that is not captured by the current model.
6. The results of the statistical analyses led to the rejection of the null hypothesis and acceptance of the alternative hypothesis that artificial intelligence (AI) personalization leads to a positive relationship with consumer engagement.

9.2 Managerial Implications

The results have implications for the e-tailers in the luxury cosmetics market. A stronger association of consumer engagement with the higher perceived personalization of the AI-powered experience suggests that e-tailers could improve personalized digital shopping experiences. Product suggestions shall be relevant to consumers' preferences and beauty-related requirements and not just generic product suggestions. AI-powered tools like personalized product suggestions, virtual try-on, shade matching, skin analysis, and AI-driven product assistance can also improve customer engagement for luxury cosmetics e-tailers. These features can help shoppers make decisions about which products to buy and help make online shopping more personal. The results also showed that personalization is not the only factor that can shape consumer engagement as the model accounted for 24.2% of the variance. So it's important that e-tailers think about personalisation as well as other factors in the digital shopping journey, such as trust, usability, product information, privacy concerns, customer service and brand experience. Last but not least, the implementation of AI personalization should consider the relevance, transparency, and responsible use of consumers' data. Luxury cosmetics e-tailers can create more personalized and meaningful digital interactions with consumers, while respecting consumer privacy, by providing useful experiences.

10. LIMITATIONS AND FUTURE RESEARCH

The present study has some limitations that should be taken into account. The first one is that the final analysis, based on the responses, was made using the 89 eligible respondents who were chosen using purposive sampling. The findings from the study cannot be generalized to the broader population of

consumers of luxury cosmetics e-tail because of the non-probability sampling method and the final sample size. Secondly, the study relied on self-reported data obtained by using a structured questionnaire. Thus, what is reported reflects the consumer's actual perception and experience of AI powered personalisation and consumer engagement, not their actual behaviour on e-commerce platforms. Thirdly, there is an internal limitation in measurement scales. The Cronbach's α for the AI-powered personalization was 0.638 and 0.505 for the consumer engagement. There were only three items included in the measure of consumer engagement, which could be one reason for this construct having a lower internal consistency. The results for the aspect of consumer engagement therefore need to be interpreted with due caution. Fourthly, the study adopted a cross sectional research design in which the data was collected during a specific time. As such, while there were clear associations and predictive relationships found, the results do not make a clear case for the causal impact of AI-driven personalization on consumer engagement. Future studies can overcome these limitations by using larger and more representative samples, whenever possible; by making use of probability sampling methods; and by using multi-item measurement scales with good psychometric properties. Longitudinal or experimental research designs can also provide more evidence of the impact of AI-powered personalization on consumer engagement over time. Future studies could build on the current model and include additional factors such as consumer trust, perceived usefulness, privacy concerns, satisfaction, purchase intention, brand experience, and loyalty, as well as any mediating and/or moderating relationships. Analysing the data from various categories of luxury products, e-commerce platforms, or geographic areas can also help develop a more comprehensive picture of how consumers react to AI-powered personalisation.

11. CONCLUSION

The present study investigates the linkage between personalization with the use of AI and consumer response in luxury cosmetics e-tailing. From the 89 eligible respondents, the results show that consumers overall had a positive attitude towards AI-powered personalization and interaction with personalized online shopping journeys. Results from the statistical analysis showed that there was a moderate positive correlation between AI-powered personalization and consumer engagement with the value of $r = 0.492$ and p value of less than 0.001. The regression further revealed that the AI-based personalization was a significant positive predictor of consumer engagement ($B = 0.678$, $t = 5.265$, $p < 0.001$), explaining 24.2% of the variance in consumer engagement ($R^2 = 0.242$). The results indicate that there is a correlation between the consumer's sense of relevance and individuality of the shopping experience with their involvement in the purchasing process. The findings suggest that when consumers feel a greater sense of relevance and individuality in the shopping experience of luxury cosmetics, they are also more likely to be engaged in the purchasing process. The study enriches the growing body of research on personalization using AI in the context of luxury cosmetics e-tail. The results from a managerial standpoint underline the importance of personalised product suggestions

and AI-powered customer assistance in engaging customers. While reading the findings, the limitations of the sampling, measurement and cross-sectional design of this study should be taken into account. In general, the study provides empirical evidence for the existence of a strong relationship between AI-powered personalization and consumer engagement in luxury cosmetics e-tailing and lays the groundwork for future research through larger sample sizes, more rigorous measurement scales validated by the literature, and more comprehensive models that include additional consumer and technology-related factors.

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