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Recommendation Explainability, Choice Visibility, and Personalization Fit as Drivers of Value-in-Use among E-Commerce Users in Indonesia

Ade Suhara [1], Tina Isnaeni [2]
[1] Universitas Buana Perjuangan Karawang ade.suhara@ubpkarawang.ac.id
[2] Universitas Nusa Putra tinaisnaeni12@gmail.com
Corresponding Author: ade.suhara@ubpkarawang.ac.id

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ABSTRACT

This study examines the relationships between clarity of recommendations, visibility of options, appropriateness of personalization, and perceived user value among e-commerce users in Indonesia. A quantitative explanatory approach with a cross-sectional survey design was employed, involving 150 respondents selected through purposive sampling. Data were collected using a structured questionnaire with a five-point Likert scale and analyzed through multiple linear regression using SPSS version 25. The findings reveal that clarity of recommendations ($\beta = 0.301$; $p < 0.001$), visibility of options ($\beta = 0.310$; $p < 0.001$), and appropriateness of personalization ($\beta = 0.427$; $p < 0.001$) have positive and statistically significant relationships with perceived user value. Personalization appropriateness emerged as the strongest predictor, highlighting the importance of delivering relevant and contextually suitable product recommendations. The overall regression model was statistically significant ($F = 66.174$; $p < 0.001$), explaining 57.6% of the observed variation in perceived user value ($R^2 = 0.576$). These findings demonstrate that recommendation clarity, accessible product alternatives, and relevant personalization are important characteristics of value-oriented e-commerce experiences. The study contributes to digital commerce literature by integrating three consumer-centered recommendation dimensions within a unified empirical framework. Practically, the findings emphasize the importance of improving recommendation transparency, product comparison accessibility, and personalization relevance to enhance consumers' perceived shopping value.

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Corresponding Author:
Name: Ade Suhara
Institution: Universitas Buana Perjuangan Karawang
Email: ade.suhara@ubpkarawang.ac.id

INTRODUCTION

The rapid expansion of electronic commerce (e-commerce) has transformed consumer behavior, business competition, and digital value creation through artificial intelligence, personalized recommendation systems, and interactive technologies. These developments enable consumers to access product information, compare alternatives, and make purchasing decisions more efficiently. However, the effectiveness of e-commerce platforms increasingly depends on recommendation clarity, option visibility, and personalization appropriateness. Indonesia provides a relevant context due to its rapidly growing digital economy and increasing adoption of online shopping services. Statistics Indonesia (BPS, 2025) documented the development of Indonesian e-commerce businesses, while the International Trade Administration (2025) identified Indonesia as Southeast Asia's largest e-commerce market. Major platforms, including Shopee, Tokopedia, Lazada, and Blibli, compete through personalized services and innovative shopping experiences. A meta-analysis involving 122 samples and 32,172 consumers confirmed that recommendation quality positively influences decision-making satisfaction and continued usage intentions (Testing the Performance of Online Recommendation Agents, 2023). These findings highlight the importance of understanding how recommendation-related characteristics contribute to perceived user value.

Clarity of recommendations is an essential factor influencing consumers' ability to understand product suggestions and make informed purchasing decisions. Clear recommendations reduce uncertainty, improve information comprehension, and facilitate efficient product evaluation (Krisdiyanto & Dewi, 2023; Tasci, 2021). Conversely, ambiguous explanations may increase cognitive effort and weaken consumer confidence. Tintarev and Masthoff (2012) emphasized that recommendation explanations contribute to transparency, trust, satisfaction, and decision-making effectiveness. Similarly, the Technology Acceptance Model developed by Davis (1989) suggests that perceived usefulness and ease of use influence technology acceptance. In e-commerce, understandable recommendations may enhance these perceptions by simplifying product comparisons and reducing information-processing difficulties. Therefore, greater recommendation clarity is expected to improve perceived user value through more efficient and confident purchasing decisions.

Visibility of options represents consumers' ability to identify, access, and compare relevant product alternatives within e-commerce platforms. Although digital marketplaces offer extensive product selections, algorithmic rankings, sponsored placements, and personalized recommendations may restrict consumers' exposure to available alternatives (Suali, 2024; Wandoko & Panggati, 2022). Effective option visibility requires accessible information and organized product comparisons that support independent decision-making. Wang et al. (2024) demonstrated that product organization and perceived variety influence consumers' acceptance of recommendations, particularly within the personalization–privacy paradox. In Indonesia, where e-commerce platforms provide numerous products, sellers, and promotional offers, option visibility becomes increasingly important. Consumers who can efficiently compare alternatives may experience reduced search effort, greater decision autonomy, and improved purchasing confidence. Thus, visibility of options is expected to contribute positively to perceived user value.

Appropriateness of personalization refers to the extent to which customized recommendations correspond to consumers' preferences, needs, and purchasing contexts. Relevant personalization can improve product discovery, reduce search effort, and enhance shopping efficiency, whereas irrelevant or intrusive recommendations may reduce perceived usefulness. Song et al. (2021) demonstrated that perceived usefulness positively influences intentions to adopt

personalized e-commerce technologies, while privacy concerns affect consumer responses. Gouthier et al. (2022) found that personalization generates positive utility, although its benefits depend on information sensitivity and may diminish under certain conditions. Furthermore, Canhoto et al. (2023) emphasized the importance of consumer autonomy and control over personal information in AI-enabled personalization. Recent research also identified transparency, trust, and governance as important factors in personalized digital commerce (Navigating Trust and the Personalization–Privacy Paradox in AI-Driven E-Commerce, 2026). Accordingly, personalization appropriateness is expected to enhance perceived user value when recommendations remain relevant, beneficial, and respectful of consumer preferences.

Perceived user value refers to consumers' assessment of the benefits obtained from e-commerce platforms relative to the time, effort, and resources expended during shopping activities. Zeithaml (1988) conceptualized perceived value as an evaluation of benefits relative to sacrifices, providing the theoretical foundation for this study. In digital commerce, perceived value includes convenience, information quality, decision-making efficiency, and overall platform usefulness. Previous studies have examined recommendation explanations, technology acceptance, personalization, and privacy concerns separately (Tintarev & Masthoff, 2012; Song et al., 2021; Wang et al., 2024). However, limited empirical attention has been directed toward simultaneously examining recommendation clarity, option visibility, and personalization appropriateness as predictors of perceived user value among Indonesian e-commerce consumers. This gap highlights the need for an integrated empirical framework incorporating Perceived Value Theory and the Technology Acceptance Model (Davis, 1989) to explain how these characteristics collectively shape consumers' evaluations of digital shopping experiences.

Based on this research gap, the study aims to examine the individual and simultaneous relationships between recommendation clarity, option visibility, personalization appropriateness, and perceived user value among Indonesian e-commerce users. Four hypotheses are proposed: (H1) recommendation clarity positively influences perceived user value; (H2) option visibility positively influences perceived user value; (H3) personalization appropriateness positively influences perceived user value; and (H4) the three independent variables jointly explain significant variation in perceived user value.

LITERATURE REVIEW

2.1 Theoretical Foundations

The theoretical foundation of this study integrates Perceived Value Theory, the Technology Acceptance Model (TAM), and consumer decision-making theory to explain the relationships between recommendation clarity, option visibility, personalization appropriateness, and perceived user value in e-commerce. Perceived Value Theory emphasizes consumers' evaluation of benefits relative to sacrifices, including time, effort, and convenience (Zeithaml, 1988). TAM highlights perceived usefulness and ease of use as determinants of technology acceptance (Davis, 1989), while consumer decision-making theory emphasizes the importance of accessible and manageable product alternatives. Iyengar and Lepper (2000) demonstrated that excessive choice may reduce consumer motivation and satisfaction, emphasizing the importance of effective information organization. Furthermore, Xiao and Benbasat (2007) highlighted how recommendation system characteristics, information presentation, and user interactions influence consumer evaluations and decision quality. Based on these perspectives, this study proposes that clear recommendations, accessible

product alternatives, and relevant personalization contribute to greater perceived user value by improving information comprehension, decision-making efficiency, and shopping convenience.

2.2 Perceived User Value

Perceived user value refers to consumers' evaluation of the benefits gained from using e-commerce platforms relative to the time, effort, costs, and risks involved in online shopping (Zeithaml, 1988). In digital commerce, perceived value encompasses functional, informational, convenience, and decision-support benefits, including efficient product discovery, relevant recommendations, and informed purchasing decisions (Amarullah, 2023; Ling et al., 2023). Clear recommendations, accessible product alternatives, and appropriate personalization can enhance shopping efficiency and reduce cognitive effort, while unclear information and irrelevant suggestions may diminish perceived value. Unlike transactional indicators such as purchase frequency or spending, perceived user value emphasizes consumers' subjective assessments of platform usefulness and overall shopping experiences. Accordingly, this study conceptualizes perceived user value as a single dependent variable reflecting the extent to which e-commerce platforms provide meaningful benefits, facilitate purchasing decisions, and improve shopping convenience.

2.3 Clarity of Recommendations

Clarity of recommendations refers to the extent to which product suggestions on e-commerce platforms are understandable, informative, and relevant to consumers' purchasing needs. Xiao and Benbasat (2007) emphasized that recommendation system design and information presentation influence perceived usefulness and decision quality. Similarly, Tintarev and Masthoff (2012) highlighted the importance of recommendation explanations in enhancing transparency, trust, satisfaction, and decision-making efficiency. Clear recommendations enable consumers to understand product attributes, compare alternatives, and evaluate suitability with less cognitive effort, while ambiguous information may increase uncertainty and reduce confidence (Krisdiyanto & Dewi, 2023; Tasci, 2021; Zayed et al., 2022). In this study, recommendation clarity is measured through information understandability, presentation clarity, recognizable relevance, and ease of product evaluation. Accordingly, greater recommendation clarity is expected to enhance perceived user value by improving information comprehension, shopping efficiency, and purchasing confidence.

2.4 Visibility of Options

Visibility of options refers to consumers' ability to identify, access, and compare relevant product alternatives within e-commerce platforms, emphasizing accessibility and information organization rather than the number of available products. Iyengar and Lepper (2000) demonstrated that excessive choices may reduce consumer motivation and satisfaction when alternatives are difficult to evaluate. Similarly, Xiao and Benbasat (2007) highlighted the importance of recommendation system design in shaping consumer decisions, while Tam and Ho (2006) emphasized that personalized content influences attention and information processing. Effective option visibility enables consumers to compare prices, product features, and seller characteristics while reducing search effort and uncertainty (Aripin et al., 2023; Auliani, 2023; Harly & Octavia, 2014). In this study, option visibility is measured through alternative accessibility, visibility of relevant choices, ease of comparison, and clarity of product differences. Accordingly, greater option visibility is expected to enhance perceived user value by improving decision-making efficiency, consumer autonomy, and purchasing confidence.

2.5 Appropriateness of Personalization

Appropriateness of personalization refers to the extent to which customized recommendations and shopping content align with consumers' preferences, needs, and purchasing contexts. Tam and Ho (2006) emphasized that content relevance and goal specificity influence information processing and decision-making, while their research also highlighted the role of personalization in shaping users' information exploration. Effective personalization improves product discovery, reduces search effort, and enhances shopping efficiency, whereas irrelevant or intrusive recommendations may reduce perceived usefulness and raise privacy concerns (Aripin et al., 2023; Astria & Santi, 2021). In this study, personalization appropriateness is measured through recommendation relevance, preference alignment, contextual suitability, and perceived usefulness. Accordingly, appropriate personalization is expected to enhance perceived user value by improving information relevance, purchasing efficiency, and overall shopping experiences.

2.6 Hypothesis Development

Clarity of recommendations is expected to positively influence perceived user value by improving information comprehension, reducing cognitive effort, and facilitating informed purchasing decisions. Davis (1989) emphasized that perceived usefulness and ease of use contribute to technology acceptance, while Xiao and Benbasat (2007) highlighted the importance of recommendation system design in supporting consumer decision-making. Similarly, Tintarev and Masthoff (2012) identified transparency, effectiveness, satisfaction, and efficiency as key objectives of recommendation explanations. Clear and understandable product suggestions enable consumers to evaluate alternatives more confidently and efficiently, thereby enhancing their shopping experiences. Based on these theoretical arguments, the following hypothesis is proposed:

H1: Clarity of recommendations has a positive and statistically significant relationship with perceived user value among e-commerce users in Indonesia.

Visibility of options is expected to positively influence perceived user value by providing consumers with accessible and comparable product alternatives that support informed purchasing decisions. Effective option visibility reduces search effort, improves decision-making efficiency, and strengthens consumer autonomy. Iyengar and Lepper (2000) demonstrated that excessive choice may reduce motivation and satisfaction, emphasizing the importance of well-organized and manageable alternatives rather than merely increasing product variety. When consumers can easily identify, evaluate, and compare relevant products beyond algorithmically recommended options, they may experience greater informational benefits and purchasing confidence (Aripin et al., 2023; Auliani, 2023). Based on these theoretical arguments, the following hypothesis is proposed:

H2: Visibility of options has a positive and statistically significant relationship with perceived user value among e-commerce users in Indonesia.

Appropriateness of personalization is expected to positively influence perceived user value by providing relevant recommendations that align with consumers' preferences and purchasing needs. Tam and Ho (2006) emphasized that content relevance and self-reference influence information processing and decision-making outcomes. Effective personalization reduces search effort, improves product discovery, and enhances shopping efficiency, while irrelevant or intrusive recommendations may diminish perceived usefulness and raise privacy concerns. From the perspective of Perceived Value Theory, personalized experiences that match consumers' needs can increase functional, informational, and convenience benefits. Based on these theoretical arguments, the following hypothesis is proposed:

H3: Appropriateness of personalization has a positive and statistically significant relationship with perceived user value among e-commerce users in Indonesia.

The combined relationship between recommendation clarity, option visibility, personalization appropriateness, and perceived user value reflects the complementary benefits of information comprehension, choice accessibility, and recommendation relevance. Clear recommendations improve product understanding, visible alternatives facilitate comparisons, and appropriate personalization ensures that suggestions align with consumers' preferences. Drawing upon Perceived Value Theory and the Technology Acceptance Model, these characteristics collectively enhance platform usefulness, reduce cognitive effort, and improve shopping efficiency. Although their individual contributions may vary according to consumer needs, their simultaneous integration is expected to strengthen perceived user value. Based on these theoretical arguments, the following hypothesis is proposed:

H4: Clarity of recommendations, visibility of options, and appropriateness of personalization jointly explain statistically significant variation in perceived user value among e-commerce users in Indonesia.

METHODS

This study employs a quantitative approach with an explanatory and cross-sectional research design to examine the relationships between clarity of recommendations (X1), visibility of options (X2), appropriateness of personalization (X3), and perceived user value (Y) among e-commerce users in Indonesia. The research framework is grounded in Perceived Value Theory (Zeithaml, 1988), the Technology Acceptance Model (Davis, 1989), and e-commerce recommendation system research (Xiao & Benbasat, 2007). The target population consists of Indonesian consumers who have experience using e-commerce platforms, including Shopee, Tokopedia, Lazada, and Blibli. A sample of 150 respondents is specified using non-probability purposive sampling, with eligibility criteria requiring participants to be at least 17 years old, reside in Indonesia, have purchased products online within the previous six months, and have encountered recommendation or personalization features. The sample size exceeds the minimum regression sample guidelines proposed by Green (1991), supporting its suitability for the three-predictor model.

Primary data are collected through a structured online questionnaire consisting of 16 measurement items distributed equally across four research variables. Each construct is measured using four indicators on a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). Recommendation clarity is assessed through understandability, information clarity, relevance, and ease of evaluation, while option visibility is measured through alternative accessibility, choice visibility, comparison convenience, and product differentiation. Personalization appropriateness includes preference alignment, contextual suitability, recommendation relevance, and perceived usefulness, whereas perceived user value encompasses shopping benefits, efficiency, decision-support usefulness, and overall platform value. Respondents evaluate their most frequently used e-commerce platform to ensure consistency. Data collection incorporates informed consent, confidentiality protection, and response screening. Instrument validity is assessed through content evaluation and corrected item–total correlations, with a minimum guideline of 0.30, while reliability is evaluated using Cronbach's alpha, with values of at least 0.70 indicating acceptable internal consistency.

Data analysis is conducted using IBM SPSS Statistics version 25, incorporating descriptive statistics, instrument validity and reliability testing, classical regression assumption tests, and multiple linear regression analysis. Assumption testing includes residual normality, multicollinearity, heteroscedasticity, linearity, and influential observations. The regression model is

specified as $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \varepsilon$, where Y represents perceived user value and X1, X2, and X3 represent the three independent variables. Individual t-tests are employed to examine the statistical significance of each predictor (H1–H3), while the overall F-test evaluates the joint explanatory significance of the regression model (H4). Hypothesis testing is conducted at a 5% significance level ($p < 0.05$), with coefficient direction considered when evaluating directional hypotheses. The coefficient of determination (R^2) and adjusted R^2 are used to assess the model's explanatory power. Given the cross-sectional design and non-probability sampling approach, the findings are interpreted as statistical associations rather than definitive causal relationships or unrestricted population-level generalizations.

RESULTS AND DISCUSSION

4.1 Descriptive Statistical Analysis

Descriptive statistical analysis provides an overview of the distribution of scores across the four research variables.

Table 1. Descriptive Statistics of Research Variables

Variable	N	Mean	Std. Deviation	Minimum	Maximum
Clarity of Recommendations (X1)	150	3.628	0.790	1.750	5.000
Visibility of Options (X2)	150	3.627	0.809	1.750	5.000
Appropriateness of Personalization (X3)	150	3.568	0.786	1.250	5.000
Perceived User Value (Y)	150	3.595	0.807	1.500	5.000

Table 1 presents the descriptive statistics of the research variables based on 150 respondents. Clarity of Recommendations (X1) recorded the highest mean score (3.628; SD = 0.790), followed by Visibility of Options (X2) (3.627; SD = 0.809), Perceived User Value (Y) (3.595; SD = 0.807), and Appropriateness of Personalization (X3) (3.568; SD = 0.786). All variables demonstrated relatively favorable mean scores, indicating generally positive consumer perceptions of e-commerce recommendation features and perceived value. The minimum scores ranged from 1.250 to 1.750, while the maximum score reached 5.000 across all variables. The standard deviations, ranging from 0.786 to 0.809, indicate moderate variability in respondents' evaluations.

4.2 Instrument Validity and Reliability Testing

4.2.1 Item Validity Assessment

An initial assessment of item discrimination was conducted using corrected item–total correlations. This procedure evaluates the extent to which each questionnaire item is associated with the remaining items within its corresponding construct. A corrected item–total correlation of at least 0.30 serves as the minimum screening threshold.

Table 2. Corrected Item–Total Correlation Results

Variable	Item	Corrected Item–Total Correlation	Assessment
Clarity of Recommendations	X1.1	0.759	Meets criterion
	X1.2	0.786	Meets criterion
	X1.3	0.797	Meets criterion
	X1.4	0.784	Meets criterion
Visibility of Options	X2.1	0.825	Meets criterion
	X2.2	0.776	Meets criterion
	X2.3	0.801	Meets criterion
	X2.4	0.830	Meets criterion
Appropriateness of Personalization	X3.1	0.794	Meets criterion
	X3.2	0.762	Meets criterion
	X3.3	0.738	Meets criterion
	X3.4	0.743	Meets criterion
Perceived User Value	Y1	0.796	Meets criterion
	Y2	0.781	Meets criterion
	Y3	0.818	Meets criterion
	Y4	0.844	Meets criterion

Table 2 presents the corrected item–total correlation results for all 16 questionnaire items across four research variables. Clarity of Recommendations (X1) recorded correlation values ranging from 0.759 to 0.797, Visibility of Options (X2) from 0.776 to 0.830, Appropriateness of Personalization (X3) from 0.738 to 0.794, and Perceived User Value (Y) from 0.781 to 0.844. All items exceeded the minimum recommended threshold of 0.30, indicating satisfactory item discrimination and internal consistency within their respective constructs. The highest correlation was observed for item Y4 (0.844), while the lowest was recorded for item X3.3 (0.738).

4.2.2 Reliability Testing

Reliability analysis was conducted using Cronbach's alpha to assess internal consistency within each four-item construct. A coefficient of at least 0.70 was adopted as the threshold for acceptable reliability.

Table 3. Reliability Test Results

Variable	Number of Items	Cronbach's Alpha	Assessment
Clarity of Recommendations (X1)	4	0.902	Acceptable
Visibility of Options (X2)	4	0.916	Acceptable
Appropriateness of Personalization (X3)	4	0.890	Acceptable

Perceived User Value (Y)	4	0.916	Acceptable

Table 3 presents the reliability test results for the four research variables, each measured using four questionnaire items. Clarity of Recommendations (X1) obtained a Cronbach's alpha of 0.902, Visibility of Options (X2) recorded 0.916, Appropriateness of Personalization (X3) achieved 0.890, and Perceived User Value (Y) reached 0.916. All coefficients exceeded the recommended threshold of 0.70, indicating high internal consistency and satisfactory reliability across all constructs. Visibility of Options and Perceived User Value demonstrated the highest reliability coefficients, while Appropriateness of Personalization recorded the lowest, although still within an acceptable range. Overall, these findings confirm that all four measurement scales demonstrate adequate reliability and are suitable for subsequent statistical analysis.

4.3 Classical Regression Assumption Tests

Before estimating the multiple linear regression model, diagnostic procedures were conducted to assess residual normality, multicollinearity, heteroscedasticity, and residual autocorrelation.

Table 4. Regression Diagnostic Test Results

Diagnostic Test	Statistical Indicator	Result	Interpretation
Residual normality	Shapiro–Wilk p-value	0.096	Normality not rejected
Multicollinearity (X1)	VIF	1.119	No substantial multicollinearity
Multicollinearity (X2)	VIF	1.168	No substantial multicollinearity
Multicollinearity (X3)	VIF	1.172	No substantial multicollinearity
Heteroscedasticity	Breusch–Pagan p-value	0.489	No statistically significant heteroscedasticity detected
Residual autocorrelation	Durbin–Watson	1.986	No apparent first-order autocorrelation

Table 4 presents the regression diagnostic test results, indicating that the model satisfies the assessed classical regression assumptions. The Shapiro–Wilk test yielded a p-value of 0.096 (> 0.05), indicating that residual normality was not rejected. Multicollinearity testing showed low variance inflation factor (VIF) values for Clarity of Recommendations (X1 = 1.119), Visibility of Options (X2 = 1.168), and Appropriateness of Personalization (X3 = 1.172), suggesting no substantial multicollinearity among predictors. The Breusch–Pagan test produced a p-value of 0.489 (> 0.05), indicating no statistically significant evidence of heteroscedasticity. Furthermore, the Durbin–Watson statistic of 1.986 suggests no apparent first-order residual autocorrelation. Overall, these findings indicate that the regression model meets the evaluated diagnostic criteria and is suitable for subsequent multiple linear regression analysis.

4.4 Multiple Linear Regression Analysis

Multiple linear regression was applied to estimate the relationships between clarity of recommendations, visibility of options, appropriateness of personalization, and perceived user value.

Table 5. Multiple Linear Regression Coefficients

Variable	B	Std. Error	Standardized Beta	t	Sig.
Constant	-0.209	0.276	—	-0.757	0.450
Clarity of Recommendations (X1)	0.308	0.058	0.301	5.285	<0.001
Visibility of Options (X2)	0.309	0.058	0.310	5.319	<0.001
Appropriateness of Personalization (X3)	0.439	0.060	0.427	7.327	<0.001

Table 5 presents the multiple linear regression results, indicating that all three independent variables have positive and statistically significant relationships with Perceived User Value (Y). Clarity of Recommendations (X1) recorded a regression coefficient of 0.308 ($\beta = 0.301$; $t = 5.285$; $p < 0.001$), while Visibility of Options (X2) demonstrated a coefficient of 0.309 ($\beta = 0.310$; $t = 5.319$; $p < 0.001$). Appropriateness of Personalization (X3) exhibited the strongest standardized relationship with perceived user value ($B = 0.439$; $\beta = 0.427$; $t = 7.327$; $p < 0.001$). Meanwhile, the constant was negative but statistically insignificant ($B = -0.209$; $p = 0.450$). The estimated regression equation is $Y = -0.209 + 0.308X1 + 0.309X2 + 0.439X3$. Overall, these findings support H1, H2, and H3, demonstrating that clearer recommendations, greater option visibility, and more appropriate personalization are significantly associated with higher perceived user value, with personalization appropriateness showing the largest standardized coefficient.

Table 6. Analysis of Variance (ANOVA) for the Regression Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	55.941	3	18.647	66.174	<0.001
Residual	41.143	146	0.282	—	—
Total	97.084	149	—	—	—

Table 6 presents the Analysis of Variance (ANOVA) results for the multiple linear regression model, indicating that Clarity of Recommendations (X1), Visibility of Options (X2), and Appropriateness of Personalization (X3) jointly explain statistically significant variation in Perceived User Value (Y). The regression model produced an F-statistic of 66.174 with degrees of freedom of 3 and 146 ($p < 0.001$), demonstrating overall statistical significance at the 5% level. The regression sum of squares was 55.941, compared with a residual sum of squares of 41.143 and a total sum of squares of 97.084. These findings indicate that the three predictors collectively provide significant explanatory power for perceived user value among Indonesian e-commerce users. Accordingly, H4 is supported, confirming the joint statistical significance of the proposed regression model.

4.5 Coefficient of Determination

The model summary indicates that Clarity of Recommendations (X1), Visibility of Options (X2), and Appropriateness of Personalization (X3) collectively explain a substantial proportion of variation in Perceived User Value (Y). The multiple correlation coefficient (R = 0.759) indicates a strong relationship between the observed and predicted values, while the coefficient of determination ($R^2 = 0.576$) shows that 57.6% of the variation in perceived user value is explained by the three independent variables. The adjusted R^2 of 0.568 indicates that the model retains considerable explanatory power after accounting for the number of predictors, while the remaining 42.4% of variation is not explained by the model. Furthermore, the standard error of estimate (0.531) reflects the residual variation in predicted values. Overall, these findings demonstrate that the proposed regression model has substantial explanatory power in assessing perceived user value among Indonesian e-commerce users.

4.6 Discussion

The findings demonstrate that clarity of recommendations has a positive and statistically significant relationship with perceived user value among Indonesian e-commerce users (B = 0.308; $\beta = 0.301$; $p < 0.001$), supporting H1. This result indicates that understandable and informative product recommendations contribute to consumers' positive evaluations of their online shopping experiences. Clear recommendations enable users to identify relevant product attributes, evaluate alternatives, and make purchasing decisions with greater confidence while reducing cognitive effort. These findings align with Davis (1989), who emphasized the importance of perceived usefulness and ease of use in technology acceptance, and Xiao and Benbasat (2007), who highlighted the influence of recommendation system characteristics on consumer decision-making. Furthermore, Tintarev and Masthoff (2012) identified transparency, effectiveness, and efficiency as important objectives of recommendation explanations. The present findings extend these perspectives by demonstrating that recommendation clarity is significantly associated with perceived user value in the Indonesian e-commerce context. Consequently, e-commerce platforms should prioritize understandable product descriptions, transparent recommendation information, and user-friendly interfaces to enhance shopping efficiency and consumer evaluations.

The results also reveal that visibility of options positively and significantly relates to perceived user value (B = 0.309; $\beta = 0.310$; $p < 0.001$), supporting H2. This finding suggests that consumers obtain greater value when relevant product alternatives are easily accessible, distinguishable, and comparable. Effective option visibility facilitates price comparisons, product evaluations, and independent purchasing decisions while reducing search-related difficulties. These results are consistent with Iyengar and Lepper (2000), who demonstrated that extensive product choices do not necessarily improve consumer satisfaction when alternatives are difficult to evaluate. Similarly, Xiao and Benbasat (2007) emphasized the importance of recommendation system design in supporting consumer decisions, while Tam and Ho (2006) highlighted the influence of personalized information on attention and information processing. The findings reinforce the distinction between product assortment size and meaningful option visibility, suggesting that well-organized alternatives may provide greater benefits than simply displaying numerous products. For Indonesian e-commerce platforms, improving search filters, product comparison features, and the accessibility of alternative recommendations may strengthen consumer autonomy, decision-making efficiency, and perceived platform value.

Appropriateness of personalization emerged as the strongest predictor of perceived user value (B = 0.439; $\beta = 0.427$; $p < 0.001$), supporting H3 and indicating that recommendation relevance

and alignment with consumer preferences are particularly important in digital shopping experiences. This finding supports Tam and Ho (2006), who demonstrated that personalized content influences information processing and decision outcomes through relevance and goal alignment. It is also consistent with Song et al. (2021), Gouthier et al. (2022), and Canhoto et al. (2023), who emphasized the benefits of relevant personalization alongside considerations of privacy, information sensitivity, and consumer autonomy. Furthermore, the overall regression model was statistically significant ($F = 66.174$; $p < 0.001$), supporting H4, with an R^2 of 0.576 and adjusted R^2 of 0.568. These results indicate that recommendation clarity, option visibility, and personalization appropriateness collectively explain 57.6% of the observed variation in perceived user value. From the perspective of Perceived Value Theory (Zeithaml, 1988), these findings suggest that e-commerce platforms can enhance consumer value by improving informational benefits while reducing search effort and decision-making complexity. The study contributes to the literature by integrating three complementary recommendation-related characteristics within a single empirical framework. Practically, e-commerce managers should prioritize contextually relevant personalization while maintaining recommendation transparency and accessible product alternatives. Nevertheless, the cross-sectional design and purposive sampling approach limit causal interpretation and population-level generalizability, indicating the need for future longitudinal studies and broader representative samples.

CONCLUSION

This study concludes that clarity of recommendations, visibility of options, and appropriateness of personalization have positive and statistically significant relationships with perceived user value among Indonesian e-commerce users. All four research hypotheses were supported, confirming the individual and joint explanatory significance of the three independent variables. Appropriateness of personalization demonstrated the strongest standardized relationship ($\beta = 0.427$), followed by visibility of options ($\beta = 0.310$) and clarity of recommendations ($\beta = 0.301$). The regression model explained 57.6% of the observed variation in perceived user value, indicating substantial explanatory power. These findings emphasize that consumers derive greater value from e-commerce platforms when product recommendations are understandable, alternative choices are accessible, and personalized content aligns with their preferences and purchasing needs. Theoretically, this research contributes to the understanding of perceived user value by integrating recommendation clarity, option visibility, and personalization appropriateness within a unified framework. Practically, e-commerce platform managers should prioritize relevant personalization, transparent recommendation systems, and effective product comparison features to improve shopping efficiency and consumer experiences. Nevertheless, the cross-sectional research design and purposive sampling technique limit causal interpretation and generalizability. Future research is encouraged to employ longitudinal designs, larger and more representative samples, and additional variables such as consumer trust, perceived privacy, and digital literacy to provide a more comprehensive understanding of value creation in e-commerce environments.

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