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**FROM COMFORT TO CONCERN: THE EFFECT OF ARTIFICIAL INTELLIGENCE  
(AI) PERSONALIZATION AND DATA PRIVACY RISK PERCEPTION ON  
CONSUMER LOYALTY ON SHOPEE E-COMMERCE IN SURABAYA**

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**Abstract**

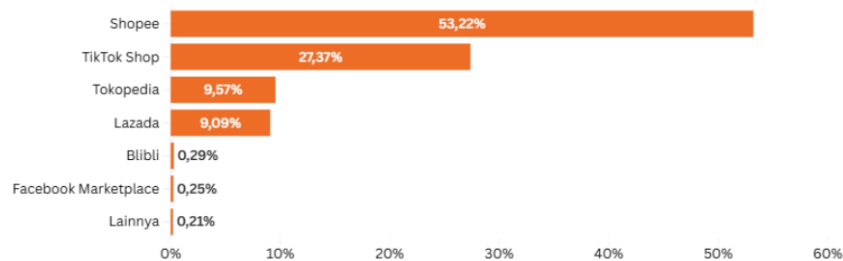
Digital transformation in business activities has led to the emergence of various e-commerce platforms, one of which is Shopee, a widely used platform in Indonesia. This study aims to analyze the effect of Artificial Intelligence (AI) Personalization and Data Privacy Risk on Consumer Loyalty among Shopee e-commerce users in Surabaya. This study uses a quantitative method with an explanatory research approach. The population is Shopee users in Surabaya aged 18–28 years who have used the Shopee application. Sampling uses a non-probability method with purposive sampling, totaling 150 respondents. Data collection was conducted through questionnaires using a Likert scale and analyzed using IBM SPSS Statistics 23. The analysis methods include validity testing, reliability testing, classical assumption testing, multiple linear regression analysis, t-test, and F-test. The results show that AI Personalization positively and significantly affects Consumer Loyalty, Data Privacy Risk significantly affects Consumer Loyalty, and simultaneously AI Personalization and Data Privacy Risk significantly affect Consumer Loyalty among Shopee users in Surabaya.

**Keywords:** Artificial Intelligence (AI) Personalization, Data Privacy Risk, Consumer Loyalty, E-Commerce



## INTRODUCTION

The development of digital technology has driven a major transformation in Indonesia's economic and trade activities, particularly through the rapid growth of the e-commerce sector, which facilitates online consumer transactions. Marketplaces represent a form of digital commerce innovation that allows consumers to obtain various products more quickly and efficiently compared to conventional trading systems. One of the highly used e-commerce platforms in Indonesia is Shopee, which offers a range of digital features to support a practical and integrated shopping experience. High marketplace usage indicates a shift in consumer behavior, with increasing reliance on digital services to meet daily needs.



**Figure 1.**

### **Most Accessed E-Commerce Platforms in Indonesia in 2025**

*Source: goodstats.id (2025)*

The selection of Shopee as the research object is supported by statistical data on e-commerce platform usage in Indonesia. According to a 2025 survey by goodstats.id, Shopee was recorded as the most frequently accessed e-commerce platform in Indonesia, with a percentage of 53.22%, far exceeding other platforms. This dominance demonstrates high consumer interaction with Shopee's digital features, including its Artificial Intelligence (AI)-based recommendation system that displays products in a personalized manner. The higher the intensity of platform use, the greater the potential for consumers to experience the benefits of personalization as well as the risks of data privacy, alongside their growing dependence on digital services (Islamiati et al., 2023).

In the face of increasingly competitive digital markets, e-commerce platforms leverage AI technology to enhance service quality for users. Shopee uses AI in its search features to help users find and purchase products. This feature allows consumers to filter search results according to various criteria, such as location, seller type, payment method, shipping options, promotions, price range, reviews, brand, and product category. The filtered search results are then personalized to each user's needs (Zikry et al., 2024). Additionally, Shopee's AI



also provides product recommendations on the homepage. These recommendations are generated based on previous search history and user preferences, making the app interface more relevant for each individual. Through AI-based personalization, Shopee aims to provide a more comfortable shopping experience tailored to consumer needs. The implementation of this technology has been shown to improve the quality of users' shopping experiences on e-commerce platforms (Rabani et al., 2024).

However, implementing AI technology on digital platforms also presents challenges, particularly related to data privacy and security. Collecting large volumes of user data may raise consumer concerns about potential misuse of personal information. Perceived risks regarding personal data security can affect consumer trust in using e-commerce services (Setyawan, 2022). This creates a dilemma for platforms like Shopee: how to optimize AI-based personalization without compromising user trust in the security of their personal data.

Several previous studies have examined the use of AI-based personalization technology in e-commerce ecosystems. The growth of marketplaces as digital trade innovations has significantly changed societal transaction patterns (Luthfiansyah et al., 2024), and Shopee has become one of the most studied platforms regarding the effectiveness of its digital features (Asih, 2024). AI-based service personalization has been proven to enhance digital marketing effectiveness, as the system can tailor product content according to individual user preferences. This technology also benefits micro, small, and medium enterprises (MSMEs) marketing products through marketplaces (Santoso et al., 2024), while increasing product visibility through recommendation systems based on consumer behavior data (Aryana and Wedagama, 2025).

On the other hand, research on consumer loyalty in digital platforms shows that the quality of user experience influences consumers' long-term commitment to a platform (Sabila, 2025). Consumer loyalty forms when a platform can provide services that are relevant and meet user needs through effective digital technology (Rahmat, Darianto, and Khoiriyah, 2026). However, studies that specifically integrate AI personalization, data privacy risk, and consumer loyalty in the context of Shopee usage in Indonesia are still very limited.

This study contributes to the development of literature on digital consumer behavior, particularly regarding the influence of AI-based recommendation systems on e-commerce platform user loyalty. Practically, the study's findings can serve as a reference for MSMEs on Shopee in designing



personalization strategies that are not only business-effective. Considering Shopee's dominance in the Indonesian market and increasing consumer awareness of data privacy rights, this research is highly relevant and urgent to produce strategic recommendations with tangible impacts for e-commerce MSMEs.

## LITERATURE REVIEW

### Artificial Intelligence (AI) Personalization

Artificial Intelligence (AI) in the context of digital services refers to the capability of technological systems to mimic human cognitive processes through data analysis, machine learning, and algorithm-based decision-making (Huang and Rust, 2018). In e-commerce platforms, AI technology is applied in the form of recommendation systems that can adjust the display of products, promotions, and content based on user preferences and behavior. AI Personalization is the process of tailoring services or content individually based on users' historical data, such as search history, purchase patterns, and in-app interactions (Maylinda & Andarini, 2024). This personalization aims to increase the relevance of information so that consumers can obtain products that meet their needs more efficiently.

According to Huang and Rust (2018), there are four dimensions of AI that can be used as indicators for measuring this variable:

1. Mechanical Intelligence: AI's ability designed with limited learning but capable of adapting to maintain consistency.
2. Analytical Intelligence: AI's ability to solve complex problems systematically and consistently.
3. Intuitive Intelligence: AI's ability to generate creativity and adapt to new situations.
4. Empathetic Intelligence: AI's ability to recognize, understand, influence, and respond to users' emotions appropriately.

### Data Privacy Risk

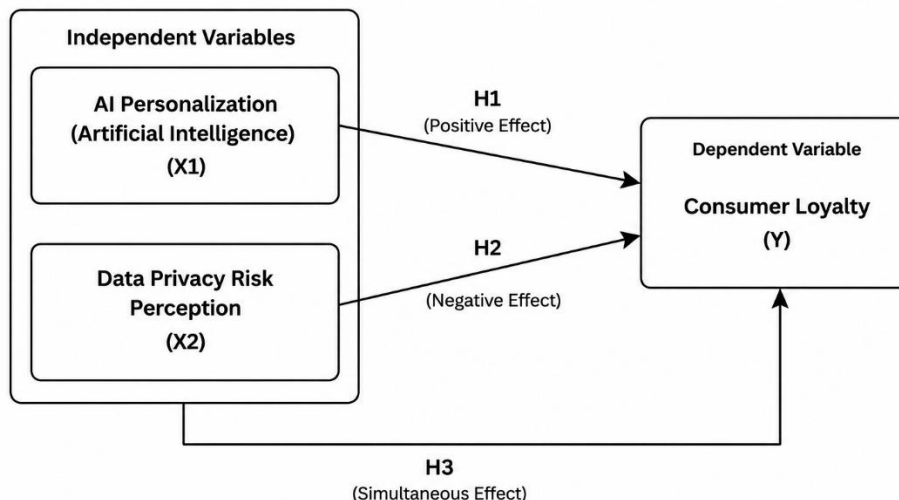
Data privacy risk refers to consumers' perception of the potential misuse, leakage, or unauthorized use of personal data during digital transactions. In e-commerce systems, collecting personal data is an essential part of service personalization mechanisms used by digital platforms to understand consumer behavior (Prayuti, 2024). However, the larger the volume of data collected, the higher the potential risk perceived by users. Perceived risk is a factor influencing consumers' online purchase decisions (Wati & Rijali, 2024). The risks perceived by consumers may include information security risks, potential misuse of

personal data, and lack of transparency in data management. In the context of e-commerce, data security and transparency of privacy policies are critical factors in building consumer trust in digital platforms (Shabilla et al., 2025). Therefore, balancing service personalization optimization with personal data protection is key to maintaining long-term relationships between consumers and marketplace platforms.

### Consumer Loyalty

Consumer loyalty is the commitment of consumers to make repeat purchases and maintain long-term relationships with a product or service (Sabila, 2025). Loyalty is reflected not only by the frequency of repeat purchases but also by the willingness of consumers to recommend products or services to others and their resistance to switching to competitors. In e-commerce, consumer loyalty is influenced by the platform usage experience, service quality, and trust in the digital system used (Maylinda & Andarini, 2024). High loyalty indicates satisfaction and positive perception of the platform, leading consumers to maintain long-term relationships.

It can be concluded that consumer loyalty in the digital ecosystem is not merely a result of repeated transactions, but rather a manifestation of deep trust, continuous product usage, and holistic satisfaction with the entire platform experience. According to (Yulinda et al. 2020), the indicators used to measure customer experience include: 1. Senses, 2. Feelings, 3. Thinking, 4. Actions, 5. Relationships.



**Figure 2.**  
**Research Model**



Based on the conceptual framework above, the hypotheses can be formulated as follows:

1. H1: AI Personalization positively affects consumer loyalty among Shopee e-commerce users in Surabaya.
2. H2: Perceived data privacy risk negatively affects consumer loyalty among Shopee e-commerce users in Surabaya.
3. H3: AI Personalization and perceived data privacy risk simultaneously affect consumer loyalty among Shopee e-commerce users in Surabaya.

## **RESEARCH METHOD**

This study uses a quantitative method with an explanatory research approach, which aims to explain the relationships and effects between the variables being studied. According to (Sugiyono, 2017), explanatory research is used to describe the position of each variable and the causal relationships between variables in a study. This research uses a Likert scale as a measurement tool to assess respondents' perceptions of the research variables. The population consists of individuals aged 18–28 years who reside in Surabaya and have used and conducted transactions through the Shopee application. The sampling technique uses non-probability sampling with a purposive sampling approach. Sample selection is based on specific criteria in accordance with the research objectives. The sample size is determined according to (Hair et al., 2019), who stated that the minimum sample size in multivariate research should be 5–10 times the number of research indicators. This study uses 15 indicators, so the 150 respondents are considered to meet the sample adequacy criteria. Data were collected through questionnaires and processed using IBM SPSS Statistics 23. Data analysis was conducted through validity testing, reliability testing, classical assumption testing, multiple linear regression analysis, and hypothesis testing using t-tests and F-tests.

## **RESULTS AND DISCUSSION**

### **Validity Test**

The validity of the data in this study was tested using the Pearson Product-Moment correlation test with the assistance of IBM SPSS Statistics 23.



**Table 1.**  
**Validity Test Results**

Variable	Item	r calculated	r table	Sig. (2-tailed)	Description
Artificial Intelligence Personalization (X1)	(AI) X1.1	0.682	0.160	<0.001	Valid
	X1.2	0.734	0.160	<0.001	Valid
	X1.3	0.737	0.160	<0.001	Valid
	X1.4	0.727	0.160	<0.001	Valid
	X1.5	0.745	0.160	<0.001	Valid
Data Privacy Risk (X2)	X2.1	0.664	0.160	<0.001	Valid
	X2.2	0.752	0.160	<0.001	Valid
	X2.3	0.734	0.160	<0.001	Valid
	X2.4	0.640	0.160	<0.001	Valid
	X2.5	0.782	0.160	<0.001	Valid
Consumer Loyalty (Y)	Y1.1	0.727	0.160	<0.001	Valid
	Y1.2	0.699	0.160	<0.001	Valid
	Y1.3	0.766	0.160	<0.001	Valid
	Y1.4	0.698	0.160	<0.001	Valid
	Y1.5	0.718	0.160	<0.001	Valid

Source: Data processed using IBM SPSS 23

Based on the test results, the correlation coefficients (r calculated) are greater than the r table values, and the significance values are less than 0.05, so all indicators in this study are declared valid.

**Reliability Test**

Reliability testing was conducted using Cronbach’s Alpha with the criterion that a variable is considered reliable if Cronbach’s Alpha > 0.70.

**Table 2.**  
**Reliability Test Results**

Variable	Cronbach's Alpha	Standard	N of Items	Description
Artificial Intelligence (AI) Personalization (X1)	0.774	0.70	5	Reliable



Variable	Cronbach's Alpha	Standard	N of Items	Description
Data Privacy Risk (X2)	0.761	0.70	5	Reliable
Consumer Loyalty (Y)	0.770	0.70	5	Reliable

Source: Data processed using IBM SPSS 23

Based on the results, the AI Personalization variable (X1) obtained a Cronbach’s Alpha value of 0.774, the Data Privacy Risk variable (X2) obtained 0.761, and the Consumer Loyalty variable (Y) obtained 0.770. All variables have Cronbach’s Alpha values greater than 0.70, so it can be concluded that all variables in this study are reliable.

**Classical Assumption Test**

**Normality Test**

Normality testing was conducted using the One-Sample Kolmogorov-Smirnov (K-S) method to determine whether the research data are normally distributed.

**Table 3.**  
**Normality Test Results**

Parameter	Unstandardized Residual
N	150
Mean	0.0000000
Std. Deviation	2.286972
Most Extreme Differences (Absolute)	0.072
Most Extreme Differences (Positive)	0.038
Most Extreme Differences (Negative)	-0.072
Test Statistic	0.072
Asymp. Sig. (2-tailed)	0.055

Source: Data processed using IBM SPSS 23

Based on the normality test using One-Sample Kolmogorov-Smirnov, the significance value obtained was 0.055. This value is greater than 0.05, so it can be concluded that the research data are normally distributed and meet the normality assumption.

**Multicollinearity Test**

Multicollinearity testing was conducted to determine whether there is a high correlation between independent variables in the regression model. The



Variance Inflation Factor (VIF) assumes that Tolerance > 0.10 or VIF < 10.0 indicates no multicollinearity.

**Table 4.**  
**Multicollinearity Test Results**

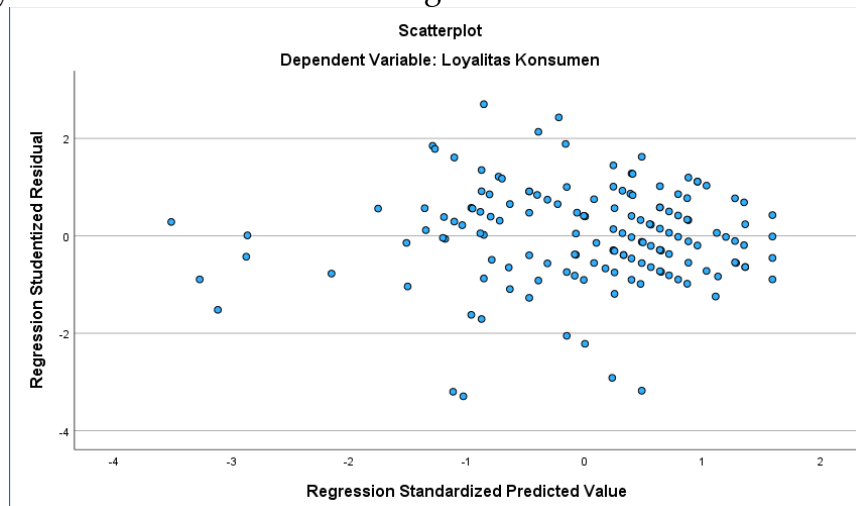
Model	B	Std. Error Beta	t	Sig.	Tolerance	VIF
1 (Constant)	4.294	1.246	3.446	0.001		
AI Personalization	0.598	0.071	8.378	0.001	0.612	1.634
Data Privacy Risk	0.191	0.071	2.703	0.008	0.612	1.634

Source: Data processed using IBM SPSS 23

Based on the results in the table above, the tolerance value for AI Personalization and Data Privacy Risk variables is 0.612, which is greater than 0.10. Meanwhile, the VIF value for both variables is 1.634, which is less than 10.00. Thus, it can be concluded that there is no multicollinearity in this regression model.

**Heteroskedasticity Test**

Heteroskedasticity testing was conducted to determine whether there is inequality of residual variance in the regression model.



**Figure 3.**  
**Scatterplot Graph**

Source: Data processed using IBM SPSS 23

The scatterplot shows that the residual points are randomly dispersed above and below 0 on the Y-axis and do not form any specific pattern. Thus, the regression model in this study does not exhibit heteroskedasticity.



### Multiple Linear Regression Analysis

Table 5.

Multiple Linear Regression Results

Model	B	Std. Error	Beta	t	Sig.
1 (Constant)	4.294	1.246		3.446	0.001
AI Personalization	0.598	0.071	0.599	8.378	0.000
Data Privacy Risk	0.191	0.071	0.193	2.703	0.008

Source: Data processed using IBM SPSS 23

Based on the Coefficients table, the constant value is 4.294, the regression coefficient for AI Personalization is 0.598, and the regression coefficient for Data Privacy Risk is 0.191. The multiple linear regression equation can be written as follows:

$$Y = 4.294 + 0.598X_1 + 0.191X_2 + e$$

Notes:

- Y = Consumer Loyalty
- X<sub>1</sub> = AI Personalization
- X<sub>2</sub> = Data Privacy Risk
- e = error

Interpretation of the regression equation:

1. The constant value of 4.294 indicates that if AI Personalization (X<sub>1</sub>) and Data Privacy Risk (X<sub>2</sub>) are zero, Consumer Loyalty (Y) is 4.294.
2. The regression coefficient for AI Personalization (X<sub>1</sub>) is 0.598, indicating that each one-unit increase in AI Personalization (X<sub>1</sub>) will increase Consumer Loyalty (Y) by 0.598, assuming other variables are constant. The positive coefficient shows that AI Personalization (X<sub>1</sub>) has a direct relationship with Consumer Loyalty (Y).
3. The regression coefficient for Data Privacy Risk (X<sub>2</sub>) is 0.191, indicating that each one-unit increase in Data Privacy Risk (X<sub>2</sub>) will increase Consumer Loyalty (Y) by 0.191, assuming other variables are constant. The positive coefficient shows that Data Privacy Risk (X<sub>2</sub>) has a direct relationship with Consumer Loyalty (Y).

T-Test

Table 6.

T-Test Results

Model	Unstandardized	Standardized	t	Sig.
	Coefficients	Coefficients		
	B	Std. Error	Beta	



Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
1 (Constant)	4.294	1.246		3.446
AI Personalization	0.598	0.071	0.599	8.378
Data Privacy Risk	0.191	0.071	0.193	2.703

a. Dependent Variable: Consumer Loyalty

Source: Data processed using IBM SPSS 23

The t-test is used to determine the effect of each independent variable partially on the dependent variable. Testing is carried out by observing the significance value. If the significance value is less than 0.05, the independent variable has a significant effect on the dependent variable.

- AI Personalization (X1) obtained a t-value of 8.378 with a significance of <0.001. The significance is less than 0.05, so AI Personalization has a positive and significant effect on Consumer Loyalty among Shopee e-commerce users in Surabaya. Therefore, the first hypothesis (H1) is accepted.
- Data Privacy Risk (X2) obtained a t-value of 2.703 with a significance of 0.008. The significance is less than 0.05, so Data Privacy Risk significantly affects Consumer Loyalty among Shopee users. However, the regression coefficient shows a positive relationship, which does not align with the second hypothesis (H2) that predicted a negative effect.

**F-Test**

The F-test is used to determine the simultaneous effect of independent variables on the dependent variable. The F-test criterion is that if F calculated > F table, the independent variables affect the dependent variable; if F calculated < F table, they do not.

**Table 7.**  
**F-Test Results (ANOVA)**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	915.734	2	457.867	86.367	<0.001
Residual	779.306	147	5.301		
Total	1695.040	149			

a. Dependent Variable: Consumer Loyalty

b. Predictors: (Constant), Data Privacy Risk, AI Personalization

Source: Data processed using IBM SPSS 23



Based on the F-test results in the ANOVA table, F calculated = 86.367 with a significance  $<0.001$ . The significance is less than 0.05, indicating that AI Personalization and Data Privacy Risk simultaneously have a significant effect on Consumer Loyalty among Shopee users in Surabaya. Therefore, the third hypothesis (H3) is accepted.

#### **AI Personalization Positively Affects Consumer Loyalty of Shopee E-Commerce Users in Surabaya**

The results show that AI Personalization has a positive effect on Consumer Loyalty among Shopee users in Surabaya. Therefore, the first hypothesis (H1) stating that “*AI Personalization positively affects Consumer Loyalty among Shopee users in Surabaya*” is accepted. AI Personalization implemented by Shopee provides product recommendations aligned with user needs and preferences. The recommendation system helps consumers find relevant products more easily, increasing convenience in shopping via the e-commerce platform. The better the service personalization provided, the higher the consumer loyalty to Shopee. These results align with Maylinda & Andarini (2024), which stated that AI-based personalization can enhance user experience through product recommendations tailored to consumer preferences.

#### **Perceived Data Privacy Risk Significantly Affects Consumer Loyalty of Shopee E-Commerce Users in Surabaya**

The results show that Perceived Data Privacy Risk significantly affects Consumer Loyalty among Shopee users. However, the regression coefficient indicates a positive relationship, which does not align with the second hypothesis (H2) predicting a negative effect. This finding suggests that consumers maintain loyalty to Shopee despite being aware of data privacy risks. This may occur because consumers perceive the benefits, convenience, and user experience provided by Shopee as greater than the concerns about personal data privacy risks. Data privacy risk remains a factor considered by consumers when using digital services because it relates to the security of personal information. This result is supported by Shabilla et al. (2025), stating that personal data protection and privacy policy transparency are critical factors in maintaining consumer trust in digital marketplaces.

#### **AI Personalization and Perceived Data Privacy Risk Simultaneously Affect Consumer Loyalty of Shopee E-Commerce Users in Surabaya**

The results show that AI Personalization and Perceived Data Privacy Risk simultaneously have a significant effect on Consumer Loyalty among Shopee users in Surabaya. Therefore, the third hypothesis (H3) stating that “*AI Personalization and Perceived Data Privacy Risk simultaneously affect Consumer*



*Loyalty among Shopee users in Surabaya*” is accepted. Simultaneously, consumer loyalty on Shopee is influenced by the platform’s ability to provide relevant product recommendations while maintaining the security and transparency of user data. Consumers tend to continue using the platform if they feel they gain a shopping experience aligned with their needs and receive effective and convenient digital services. These findings align with Huang and Rust (2018), which state that AI implementation in digital services can enhance user experience quality, thereby encouraging consumer loyalty.

## CONCLUSION

The conclusions obtained from the study on “The Effect of Artificial Intelligence (AI) Personalization and Data Privacy Risk on Consumer Loyalty of Shopee E-Commerce Users in Surabaya” are as follows:

1. Artificial Intelligence (AI) Personalization (X1) has a positive and significant effect on Consumer Loyalty (Y) of Shopee e-commerce users in Surabaya, partially. This result indicates that product recommendations tailored to users’ needs and preferences can increase consumer loyalty in using the Shopee platform.
2. Data Privacy Risk (X2) has a significant effect on Consumer Loyalty (Y) of Shopee e-commerce users in Surabaya, partially. This result shows that consumers’ perception of personal data security and management is one of the factors influencing consumer loyalty in using the Shopee platform.
3. Artificial Intelligence (AI) Personalization (X1) and Data Privacy Risk (X2) simultaneously have a significant effect on Consumer Loyalty (Y) of Shopee e-commerce users in Surabaya. This result indicates that consumer loyalty is influenced by the platform’s ability to provide relevant product recommendations while ensuring the security and transparency of user data management.

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