

The Impact of Shopee Product Recommendation and Visual Search on East Java Early Adopter Purchase Intention

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Abstract

Advances in Artificial Intelligence (AI) technology on e-commerce platforms have driven the emergence of Product Recommendation and Visual Search features to enhance the shopping experience and boost consumer purchase intent. The increasing use of AI in e-commerce is reflected in the growing demand for AI-powered shopping features, including Product Recommendation and Visual Search. However, the effectiveness of these features in influencing consumer purchase intention, particularly among early adopters, remains an important issue. This study aims to analyze the influence of Product Recommendation together with Visual Search on the purchase intent of Shopee users in the early adopter category in East Java. The research adopted a quantitative approach with purposive sampling involving 100 respondents. Data analysis was conducted using SEM-PLS with SmartPLS 4. The findings reveal that Product Recommendation and Visual Search have a significant impact on purchase intention. Moreover, their combined effect on purchase intention is statistically significant. The findings indicate that optimizing Product Recommendation and Visual Search features can increase the purchase intent of Shopee users and provide insights for the development of AI features on e-commerce platforms.

Keywords:

Product Recommendation; Visual Search; Early Adopter; Purchase Intention; Shopee.

1. INTRODUCTION

Advances in digital technology have brought significant changes in trade activities, especially through the growth of e-commerce, which enables transactions to take place quickly, easily, and without the constraints of space or time. A survey by the Indonesian Association of Indonesian Journalists (APJII) shows that Indonesia's internet penetration rate has reached 80.66%, or 229,428,417 users, indicating the significant potential for utilizing digital platforms in both business and consumption activities. Among various marketplaces, Shopee is the platform most used by internet users in Indonesia with a percentage of 53.22% (APJII, 2025). Thus, emphasizing Shopee's role as the main platform in people's online shopping activities.

The development of artificial intelligence (AI) is currently expanding rapidly and is beginning to be applied in various business activities, including e-commerce. Precedence Research (2026) estimates that the global AI market will reach US\$900 billion by 2026 and is projected to grow to US\$4,216.29 billion by 2035, with an average annual growth rate of 18.73%. This growth is also evident in the use of AI in the retail and e-commerce sectors, particularly in assisting with product search and selection. DHL eCommerce (2025) survey of 24,000 consumers across 24 markets revealed that 7 out of 10 consumers want AI-powered shopping features, such as shopping assistants, virtual try-ons, and voice-activated product search. Consumers increasingly want AI features that simplify product search and selection, with 78% of them hoping these features will be used more widely in e-commerce. In line with this, Capgemini (2025) found that 58% of consumers have used Generative AI to search for product or service recommendations as an alternative to traditional search engines. This indicates that the use of AI in e-commerce is growing and that consumers are beginning to use it to help find products and receive recommendations tailored to their needs. Shopee uses additional services designed to help users use, access, activate, or interact with various generative AI tools,

functions, features, and services. This also includes when users use, access, activate, interact with, or create AI-generated content (Shopee, 2025). The use of Artificial Intelligence on Shopee contributes to enhancing service convenience and speed, while also improving customer satisfaction and reinforcing loyalty, thereby supporting the growth of e-commerce (Khansa & Sutabri, 2024). By creating a pleasant shopping experience and increasing customer satisfaction, marketplaces can strengthen customer loyalty, attract new customers, and drive increased business profits (Yusuf et al., 2024).

However, the implementation of both features still faces several challenges. The product recommendations displayed don't always align with user needs, while Visual Search results sometimes fail to display products that perfectly match the uploaded images. This situation indicates that the use of AI technology in e-commerce is not yet fully capable of providing an optimal shopping experience, potentially impacting user purchasing intentions.

This phenomenon is interesting to study in the early adopter group, namely early adopters, who are visionary individuals who tend to embrace the risks associated with adopting new technology (Moore, 1998). Although more open to innovation, their purchasing decisions are still shaped by the perceived advantages offered by the features used. As more relevant the product recommendations and the easier the Visual Search feature is to use, the greater the chance of increased purchase intention. In various studies, innovators and early adopters are commonly classified as part of the early market because they are both more receptive to innovation and responsive to marketing messages (Sziklai & Lengyel, 2022).

Studies examining the influence of Product Recommendation together with Visual Search on purchase intention among early adopters, particularly Shopee users in East Java, remain relatively limited. Most previous studies have examined each feature separately or focused on different research contexts. Therefore, this research was undertaken to examine the effect of Product Recommendation together with Visual Search on purchase intention among early adopters of Shopee in East Java. More specifically, this research aims to examine the effect of Product Recommendation on purchase intention, analyze the influence of Visual Search on purchase intention, and evaluate the simultaneous effect of both variables on purchase intention among Shopee early adopters in East Java. The outcomes of this research are expected to enrich the literature regarding the implementation of AI technology in e-commerce and provide practical input for Shopee in improving service quality and user shopping experiences.

Product recommendation is part of the information processing system and is included in the development of artificial intelligence (Hariri & Rochim, 2022). Recommendation systems function as tools that help filter various product options so that users can more easily find what suits their interests. Essentially, these systems are designed to support the decision-making process by presenting information deemed most relevant to each user. Generally, product recommendation systems work through two principal approaches, content-based and collaborative filtering methods. Within the content-based approach, the recommendation system learns product characteristics and groups similar items to determine recommendations, although this method is often hampered by the need for detailed product information that is not always available. Meanwhile, the collaborative approach leverages behavioral similarities between users, providing product suggestions by relying on users' behavioral patterns among users who share similar characteristics. The resulting recommendations can be general for all users or tailored to the individual. The information used by the recommendation system can also be explicit, such as user ratings and reviews, or implicit, such as automatically recorded purchase history and activity, which are then compiled into profiles to generate recommendations more tailored to the user's needs (Loukili et al., 2023). Product recommendation indicators according to Ingriana (2023), namely surprise, visual design, and personalization.

H1: Product Recommendation has a positive and significant effect on Purchase Intention

Visual search systems in e-commerce work by extracting key image features through a conventional network retrained on product data, converting each image into a feature vector representing its shape, color, and visual details. These vectors are then processed using a Siamese architecture-based metric learning approach in a contiguous embedding space. Furthermore, all features are indexed using a fast search method to ensure the information retrieval system remains efficient even when the catalog is very large. Search results are then ranked based on visual similarity and tailored to user preferences. This approach enables more accurate and responsive image-based search in e-commerce (Chityala, 2023). The AI-based Visual Search feature allows product identification using images, which is considered to speed up the search process, although it still has challenges related to privacy and accuracy (Trisatin Panggabean et al., 2024). According to Venkatesan et al. (2025), Visual Search indicators are ease, accuracy, and speed.

H2: Visual Search has a positive and significant effect on Purchase intention

Purchase intention refers to the urge toward purchasing a product or service based on consumers' perceptions of the product. Purchase intention arises when consumers' decisions are shaped by the quality of the product together with the information provided about it (Safitri et al., 2024). This process involves considering various factors and comparing products or brands before finally selecting the most preferred option (Tazkiya & Faujiah, 2023). Purchase intention is formed through company stimuli designed to influence consumer purchasing decisions (Ayumi & Budiarno, 2021). The more positive consumers' perceptions of the

features offered by an e-commerce platform, the higher the tendency of consumers to be interested in purchasing the products offered. Purchasing interest indicators according to Rahmawati (2022), namely transactional interest, referential interest, and exploratory interest.

H3: Product Recommendation and Visual Search have a positive and significant simultaneous effect on Purchase Intention

2. RESEARCH METHOD

The quantitative approach is used as the type of method used in this research. As explained by Sugiyono (2021), quantitative research can be defined as a scientific approach grounded in the positivist paradigm, which believes that reality can be measured and explained through objective, empirical data. This approach focuses on producing generalizable findings through a structured data collection process and systematic statistical analysis.

The study was undertaken in East Java Province. East Java was selected as the study area because of its large population and high internet and e-commerce usage, making it potentially suitable for obtaining respondents who meet the research characteristics.

The population in this study were Shopee app users residing in East Java Province and aged 18-34 years. The study population refers to the population of East Java Province within that age range, which is estimated at 10,331,600 people, according to statistics published by the East Java Provincial Statistics Agency (BPS) (Badan Pusat Statistik, 2026).

The Slovin formula was applied to calculate the required sample size because the population size was known. A 10% error rate was used, meaning the larger the error rate, the smaller the sample size Sugiyono (2021), due to limited time available and population size (Hardani et al., 2020). The following Slovin formula was used to determine the sample size.

$$n = \frac{N}{1 + Ne^2}$$

Notes:

n = Sample size

N = Population size

e = Margin of error

$$n = \frac{N}{1 + Ne^2} = \frac{10.331.600}{1 + (10.331.600 (0,10)^2)} = \frac{10.331.600}{103.317} = 99,99$$

According to the Slovin formula, the calculated sample size was 99.99, so it was rounded up to 100 respondents.

This research relied on both primary and secondary data. Primary data were obtained through questionnaire distribution among participants who were early adopter Shopee users in East Java. Secondary data were collected from several relevant sources, such as academic books, journal publications, scholarly articles, official reports, and other references related to the research topic to support the preparation of this research.

This study employs a quantitative approach and applies the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique using SmartPLS 4 software. Data analysis consisted of descriptive statistics to summarize respondent characteristics and their responses to each research variable. Next, an assessment of the measurement model (outer model) is performed. Once this measurement model satisfies the required criteria, an assessment of the structural model (inner model) is conducted, followed by bootstrapping to examine the proposed hypotheses and simultaneous testing (Ghozali & Kusumadewi, 2016).

This research instrument was constructed using the indicators for each variable derived from prior research. All statement items were used to measure Product Recommendation, Visual Search, and Purchase Intention assessed on a five-point Likert scale with responses ranging from 1, representing "strongly disagree," to 5, representing "strongly agree." Details for all statement items are summarized in Table 1.

Table 1. Research Instruments

Variables	Code	Item
Product Recommendation (X1)	PR1	I feel like Shopee's recommendations sometimes show me surprising new options that still match my preferences.
	PR2	I feel like Shopee's product recommendations are tailored to my shopping habits.
	PR3	I feel like the recommendations on Shopee reflect my shopping preferences.
Visual Search (X2)	VS1	I find that the products that appear in Shopee's image search generally match the images I upload.

	VS2	I find that Shopee's image search results accurately display similar products.
	VS3	I don't have to wait long when using the image search on Shopee.
Purchase Intention (Y)	PI1	I'm interested in the products available on Shopee.
	PI2	I'm interested in making a purchase on Shopee.
	PI3	I recommend products on Shopee to others.
	PI4	I'm motivated to look at more product details or reviews on Shopee.

3. RESULTS AND DISCUSSION

3.1. Result

3.1.1. Respondent Characteristics

Respondent demographic characteristics were classified according to age, gender, and domicile to describe the demographic profile of the individuals who participated in the research. Table 2 presents the demographic profile of the respondents.

Table 2. Respondent Characteristics

Respondent Characteristics	Category	Frequency	Percentage
Age	18-24 years old	96	96%
	25-34 years old	4	4%
Gender	Female	60	60%
	Male	40	40%
Residence	Jawa Timur	100	100%

Based on Table 2, the majority of respondents aged 18-24 years (96 people), while respondents aged 25-34 years (4 people). In terms of gender, female respondents accounted for the majority (60 people), while male respondents totaled 40 people. All respondents came from 38 districts/cities in East Java Province, thus meeting the research criteria as early adopter Shopee users domiciled in East Java. This respondent composition provides an overview of Shopee users in the early adopter group in East Java.

3.1.2. Outer Model Evaluation

3.1.2.1. Discriminant Validity

Table 3. Convergent Validity

	Product Recommendation (X1)	Visual Search (X2)	Purchase Intention (Y)	Notes
PR1	0,766			Valid
PR2	0,792			Valid
PR3	0,861			Valid
VS1		0,847		Valid
VS2		0,831		Valid
VS3		0,769		Valid
PI1			0,842	Valid
PI2			0,806	Valid
PI3			0,795	Valid
PI4			0,781	Valid

Based on Table 3, every indicator demonstrated outer loading values above the 0.70 threshold, satisfying the convergent validity requirement and confirming their validity. These results indicate that each indicator adequately measures the construct it represents. For the Product Recommendation variable, the indicator reflects the system's ability to provide recommendations aligned with user preferences. For the Visual Search variable, the indicator represents the suitability, accuracy, and speed of the image search feature. Meanwhile, the Purchase Intention variable indicates respondents' interest in the product and their desire to make a purchase on Shopee.

3.1.2.2. Discriminant Validity

A construct is said to satisfy the discriminant validity requirement when each indicator loads more strongly on its designated construct than on any other construct and the AVE value exceeds 0.50 (Ghozali & Kusumadewi, 2016).

Table 4. Cross Loading

	Product Recommendation (X1)	Visual Search (X2)	Purchase Intention (Y)
PR1	0,766	0,455	0,463
PR2	0,792	0,522	0,464
PR3	0,861	0,407	0,463
VS1	0,432	0,847	0,523
VS2	0,483	0,831	0,536
VS3	0,484	0,769	0,542
PI1	0,526	0,504	0,842
PI2	0,475	0,506	0,806
PI3	0,409	0,573	0,795
PI4	0,443	0,529	0,781

Based on Table 4, every indicator loads most strongly on the construct it is intended to measure compared to the other constructs. This indicates that the indicators for the Product Recommendation, Visual Search, and Purchase Intention variables are able to differentiate the characteristics of each variable well.

3.1.2.3. Construct Reliability and Validity

Table 5. Construct Reliability and Validity

	Cronbach's alpha	rag Average variance extracted (AVE)
Product Recommendation (X1)	0,731	0,652
Visual Search (X2)	0,748	0,666
Purchase Intention (Y)	0,820	0,650

As shown in Table 5 Cronbach's Alpha together with Composite Reliability (pc) coefficients for all variables were above the 0.70 threshold, demonstrating that the reliability standards had been met, thus meeting reliability criteria. These results indicate that the indicators in the Product Recommendation variable are able to consistently measure user perceptions of product recommendations, the Visual Search indicator consistently represents user experience in using the image search feature, while the Purchase Intention indicator consistently describes respondents' interest in making purchases on Shopee. The AVE exceeds 0.50, confirming demonstrating that convergent validity has been established. These findings indicate these the indicators in the Product Recommendation, Visual Search, and Purchase Intention variables have been able to represent the measured constructs well, so they are considered appropriate for the next stage of analysis.

3.1.3. Inner Model Evaluation

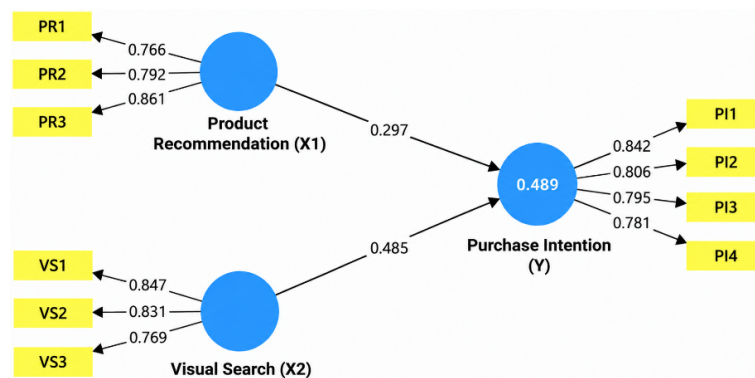


Figure 2. Structural Model of Research

3.1.3.1. R-Square

An R^2 value of 0.67 indicates a good model, 0.33 is in the moderate category, and 0.19 indicates a weak model (Ghozali & Kusumadewi, 2016).

Table 6. R Square

	R-square
Purchase Intention (Y)	0,489

As presented in Table 6, Purchase Intention recorded a coefficient of determination (R^2) of 0.489, representing a moderate level of explanatory power. The result indicates that Product Recommendation and Visual Search account for 48.9% of the variance in Purchase Intention, while the other 51.1% is attributable to

factors not included in the proposed model. This indicates that these two AI-based features play a significant role in shaping Shopee users' purchase intention, although other factors also influence it.

3.1.3.2. Hypothesis Testing

Table 7. Path Coefficient

	Original sample (O)	T statistics (O/STDEV)	P value	Notes
Product Recommendation (X1) -> Purchase Intention (Y)	0,297	2,446	0,014	Positive significant
Visual Search (X2) -> Purchase Intention (Y)	0,485	4,324	0,000	Positive significant

Based on Table 7, the Product Recommendation variable positively and significantly influences Purchase Intention, indicating that product recommendations that increasingly align with user preferences can increase purchase intention on Shopee. Meanwhile, Visual Search also positively and significantly influences Purchase Intention. Research findings indicate how image-based search features that accurately and quickly display products can encourage users to seek further information and ultimately develop a desire to make a purchase.

3.1.4. Simultaneous Test

To determine the combined influence of the independent variables on the dependent variable, a simultaneous (F) test was carried out. Based on the obtained R^2 value of 0.489 (48.9%), the calculated F statistic was determined as follows:

$$F_{\text{value}} = \frac{R^2/k}{(1 - R^2)/(n - k - 1)}$$

$$F_{\text{value}} = \frac{0,489/2}{(1-0,489)/(100-2-1)} = \frac{0,2445}{0,511/97} = 46,41$$

Notes:

R^2 : R-Square value

n : Sample size

k : Number of endogenous variables

After obtaining the calculated F value, the F table value is then determined by applying a significance level of 5% ($\alpha = 0.05$) as the decision criterion for simultaneous testing.

$$F_{\text{tabel}} = F_{\alpha}(k; n - k - 1)$$

$$F_{\text{table}} = 0,05(2; 100 - 2 - 1) = 0,05(2; 97)$$

The calculated F value (46.41) > F table (3.09), so that Product Recommendation and Visual Search simultaneously have a significant impact on Purchase intention.

3.2. Discussion

3.2.1. The Influence of Product Recommendation on Purchase Intention

Research findings demonstrate that study indicate that Product Recommendations positively and significantly influence Purchase Intention. This finding is evidenced reflected is evidenced by the path coefficient of 0.297, a t-value of 2.446, and a p-value of 0.014, therefore, Hypothesis 1 (H1) is supported. This finding indicates that the more relevant the product recommendations provided by Shopee are to the user's needs, preferences, and search history, the higher the user's purchase intention. These findings are consistent with the study carried out by Gunawan & Padmalia (2026), where the authors reported capable of artificial intelligence-based recommendations that are able to provide product suggestions according to consumer preferences can increase purchasing interest.

3.2.2. The Influence of Visual Search on Purchase Intention

According to the results of the hypothesis test, Visual Search positively and significantly influences Purchase Intention, as reflected in the estimated path coefficient of 0.485, a t-value of 4.324, and a p-value of 0.000, therefore, Hypothesis 2 is supported. These results indicate that as easier, faster, and more accurate the Visual Search feature provided by Shopee, the higher the user's purchase intention. The image-based search

feature makes it easier by helping users locate products which suit consumer preferences, thereby improving the shopping experience and encouraging the desire to make a purchase. These findings are consistent with research (Dewi & Khasaanah, 2026), Visual search demonstrates a positive and statistically significant impact toward consumers' purchasing intention. Image-based search features can improve product search efficiency and facilitate shopping, thus encouraging consumers to make purchases.

3.2.3. The Influence of Product Recommendation and Visual Search on Simultaneous Purchase Intention

Drawing on the outcomes of the simultaneous analysis, Product Recommendation and Visual Search together positively and significantly influence Purchase Intention. Support for the result is provided by the calculated F value of 46.41 exceeding the F table of 3.09, so the third hypothesis is accepted. Furthermore, the R^2 value of 0.489 suggests that both variables are capable of accounting for 48.9% of purchase intention outcomes, with the remaining proportion attributable to determinants beyond those incorporated in the conceptual model. These results indicate that the combination of product recommendations that match user preferences and the Visual Search feature that makes it easier to search for products through images can increase the purchase intention of Shopee users. Until this study was conducted, there were not many studies that simultaneously tested the effect of Product Recommendation and Visual Search on Purchase Intention, so the outcomes of this research offer a meaningful contribution to the existing literature on the application of Artificial Intelligence-based features on e-commerce platforms.

4. CONCLUSION

The conclusion drawn from this research indicates that Product Recommendation and Visual Search positively and significantly influence Purchase Intention of Shopee users in the early adopter category in East Java, both individually and collectively. The results show that Visual Search has a greater influence than Product Recommendation, while both variables together are capable of accounting for 48.9% of the variance in consumers' purchase. Furthermore, the R-squared value of 0.489 indicates that Product Recommendation and Visual Search explain 48.9% of the variation in Purchase Intention, while the remaining 51.1% is explained by other factors that are not included in this study. This research has limitations because it only involved 100 respondents in the East Java region and only tested two independent variables. Therefore, Shopee is advised to continue to improve the accuracy of the Product Recommendation and Visual Search features to be able to provide a better shopping experience and increase user purchase intention. Future research is expected to add other variables, as well as use a larger number of respondents and a wider area coverage to obtain more comprehensive results.

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