

**THE DIGITAL TUG-OF-WAR: EXAMINING BEHAVIORAL INTENTIONS
TOWARD PURE MARKETPLACE E-COMMERCE IN EMERGING MARKET**

**PERANG DIGITAL: MENGANALISIS NIAT PERILAKU TERHADAP E-
COMMERCE PASAR BERSIH DI PASAR EMERGING**

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ABSTRACT

As digital commerce becomes increasingly central to everyday life, understanding the factors that drive user adoption of e-commerce platforms is essential for both researchers and practitioners. The rapid advancement of technology has fundamentally transformed how individuals meet their daily needs, allowing transactions to occur anytime and anywhere without visiting physical stores. In this context, this study investigates the determinants of user acceptance of Tokopedia, a leading pure marketplace e-commerce platform in Indonesia, using Davis' (1989) Technology Acceptance Model (TAM). A quantitative survey was conducted with 261 Tokopedia users across Indonesia, and the data were analyzed through Structural Equation Modeling–Partial Least Squares (SEM-PLS) using SmartPLS software. The results reveal that perceived usefulness and perceived ease of use significantly shape users' attitudes, which subsequently influence their behavioral intentions and actual usage of Tokopedia. These findings confirm the applicability of TAM in explaining technology adoption behaviors among Indonesian e-commerce users. The study contributes to the literature by validating TAM within the post-pandemic digital transformation context and the evolving Indonesian e-commerce landscape following ByteDance's acquisition of Tokopedia. Practically, the results provide actionable insights for Tokopedia and other digital platforms in designing user-centered, intuitive, and sustainable strategies to enhance customer engagement, satisfaction, and long-term retention.

Keywords: E-Commerce; Marketplace; Technology Acceptance Model; Tokopedia

ABSTRAK

Seiring dengan semakin sentralnya perdagangan digital dalam kehidupan sehari-hari, memahami faktor-faktor yang mendorong adopsi platform e-commerce oleh pengguna menjadi hal yang esensial bagi baik peneliti maupun praktisi. Kemajuan teknologi yang pesat telah secara fundamental mengubah cara individu memenuhi kebutuhan sehari-hari mereka, memungkinkan transaksi terjadi kapan saja dan di mana saja tanpa perlu mengunjungi toko fisik. Dalam konteks ini, studi ini menganalisis determinan penerimaan pengguna terhadap Tokopedia, platform e-commerce marketplace murni terkemuka di Indonesia, menggunakan Model Penerimaan Teknologi (TAM) karya Davis (1989). Survei kuantitatif dilakukan terhadap 261 pengguna Tokopedia di seluruh Indonesia, dan data dianalisis menggunakan Structural Equation Modeling–Partial Least Squares (SEM-PLS) dengan perangkat lunak SmartPLS. Hasil penelitian menunjukkan bahwa persepsi kegunaan dan persepsi kemudahan penggunaan secara signifikan membentuk sikap pengguna, yang pada gilirannya mempengaruhi niat perilaku dan penggunaan aktual Tokopedia. Temuan ini mengonfirmasi kelayakan TAM dalam menjelaskan perilaku adopsi teknologi di kalangan pengguna e-commerce Indonesia. Studi ini berkontribusi pada literatur dengan memvalidasi TAM dalam konteks transformasi digital pasca-pandemi dan lanskap e-commerce Indonesia yang terus berkembang pasca akuisisi Tokopedia oleh ByteDance. Secara praktis, hasil penelitian ini memberikan wawasan yang dapat diterapkan bagi Tokopedia dan platform digital lainnya dalam merancang strategi yang berpusat pada pengguna, intuitif, dan berkelanjutan untuk meningkatkan keterlibatan pelanggan, kepuasan, dan retensi jangka panjang.

Kata Kunci: E-Commerce; Pasar Online; Model Penerimaan Teknologi; Tokopedia

INTRODUCTION

Since the outbreak of the COVID-19 pandemic in early 2020, Indonesia has experienced an unprecedented acceleration of digital

transformation, as technological advances reshaped people's lifestyles and behavioral patterns (Arianto, 2021). Nearly all aspects of life have now become dependent on digitalization,

driving the rapid evolution of technology and internet-based connectivity. According to the Indonesian Internet Service Providers Association (APJII), the number of internet users reached 221.6 million or 79.5% of Indonesia's total population in 2024 (APJII, 2024; Goodstats.com, 2024). Similar trends are highlighted by Alalwan (2020), who identified the acceleration of digital adoption during the pandemic as a key driver of e-commerce growth, and by Nguyen and Nguyen (2022), who emphasized that trust and perceived risk are crucial determinants of sustainable digital transactions in emerging markets such as Indonesia. Consistent with these findings, the Acceptance Model for Utilizing Tokopedia (Pekanbaru, 2024) demonstrated that perceived ease of use (PEOU) and perceived usefulness (PU) significantly influence users' behavioral intention and actual use of Tokopedia. Consequently, the rapid development of e-commerce in Indonesia should not be viewed merely as a consumption trend, but rather as part of a broader transformation in digital behavior.

Digital commerce, or e-commerce, stands at the forefront of this transformation, offering both primary and secondary needs through various online platforms. Major players such as Shopee, Tokopedia, Lazada, Bukalapak, and Blibli have become household names across Indonesia. According to the Ministry of Trade (2024), the e-commerce penetration rate in Indonesia increased from 19.32% in 2020 to 21.56% in 2023 and is projected to reach 34.84% by 2029. The number of e-commerce users has also surged dramatically, from 38.72 million in 2020 to 58.63 million in 2023 and is expected to exceed 99.1 million by 2029. Data from Databoks (2025) reveal that Shopee continues to dominate the market with an average of 139.5 million visits in Q4

2024, followed by Tokopedia (70.56 million) and Lazada (42.73 million).

Empirical research supports these patterns. For example, Sari (2023) found that perceived risk, perceived benefit, and trust significantly affect users' intention to use Tokopedia, underscoring the importance of psychological factors in platform competition. Similarly, Ilal et al. (2024) reported that perceived ease of use and perceived usefulness enhance purchase intention through trust as a mediating variable in the Shopee context. These findings indicate that in the increasingly competitive e-commerce landscape, user comfort, usefulness, and trust serve as crucial differentiators among platforms.

To analyze user acceptance of emerging technologies, Davis (1989) introduced the Technology Acceptance Model (TAM), which has become one of the most widely applied theoretical frameworks in explaining information system adoption behavior. TAM posits two core constructs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), which influence users' Attitude Toward Using (ATU), Behavioral Intention to Use (BIU), and Actual Use (AU). Numerous studies in the Indonesian e-commerce context have validated the relevance of TAM. For instance, Jushermi et al. (2024) found that PU and PEOU significantly affect both intention and actual use of Tokopedia in Pekanbaru. Similarly, Rohman et al. (2023) demonstrated that TAM effectively explains actual usage behavior through the PU–PEOU–ATU–BIU pathway, although not all PEOU indicators significantly influence user attitudes. Furthermore, Sari (2023) identified trust and perceived risk as key predictors of behavioral intention, while perceived benefit showed inconsistent effects. In the case of Shopee, Ilal Jinan, Huda, and Utami (2024) revealed that

while PEOU significantly impacts PU, PU does not always lead to purchase intention unless mediated by trust.

The inconsistency of these findings points to a clear research gap. Certain TAM variables show significant effects in one study but not in others, suggesting potential contextual or behavioral shifts among users. This study therefore aims to re-examine the TAM in the context of Tokopedia, particularly after its acquisition by ByteDance, which may have reshaped user experiences and behaviors. Employing Structural Equation Modeling–Partial Least Squares (SEM-PLS), this research seeks to analyze the relationships among PU, PEOU, ATU, BIU, and AU. The study makes two key contributions by empirically validating TAM in Indonesia’s evolving e-commerce ecosystem and by offering practical insights to enhance Tokopedia’s digital strategy and strengthen user engagement in a competitive online marketplace.

LITERATURE REVIEW

2.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (Davis, 1989) explains technology acceptance through two core constructs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). PU refers to the extent to which users believe that using a system will enhance their performance, while PEOU reflects the extent to which users believe that using the system will be effortless and easy to operate. These two constructs influence Attitude Toward Using (ATU), which subsequently shapes Behavioral Intention to Use (BIU) and ultimately leads to Actual Use (AU).

In the context of Indonesian e-commerce, the application of TAM has produced strong yet not always

consistent results. Jushermi, Turnip, and Musfar (2024) found that PU and PEOU significantly affect behavioral intention and actual use of Tokopedia. Rohman, Mukhsin, and Ganika (2023) confirmed that the PU–PEOU–ATU–BIU–AU pathway is generally significant, although not all PEOU indicators show a significant influence on ATU. Sari (2023) emphasized the role of trust and perceived risk in shaping users’ behavioral intentions toward Tokopedia, while perceived benefit was found to have inconsistent significance. In a comparative platform context, Ilal Jinan, Huda, and Utami (2024) revealed that while PEOU significantly affects PU, the effect of PU on purchase intention is not always significant unless mediated by trust. Collectively, these findings justify the need to re-examine the applicability of TAM in the current Tokopedia context, particularly as user behaviors continue to evolve in response to market and technological developments.

2.2 Perceived Usefulness

Perceived Usefulness (PU) is one of the main constructs in the TAM, which explains the extent to which an individual believes that using a particular technology can enhance performance in work or daily activities (Sinaga et al., 2021). The greater the perceived benefit, the higher the likelihood that users will accept and adopt the technology sustainably. In the context of e-commerce platforms such as Tokopedia, Perceived Usefulness can be reflected through consumers’ experiences in finding products more easily, saving shopping time, enjoying faster transaction processes, and accessing convenient payment methods. This aligns with Wonglimpiyarat’s (2017) view that positive experiences in perceiving the usefulness of technology

have a direct impact on improving user performance and satisfaction.

Empirical findings by Rohman et al. (2021) on Tokopedia usage through the TAM framework indicate that Perceived Usefulness has a significant influence on users' behavioral intentions and actual usage of e-commerce. In other words, when consumers perceive that Tokopedia provides tangible benefits, such as saving time, offering competitive prices, and simplifying shopping activities, their acceptance of the technology tends to increase. Therefore, Perceived Usefulness functions not only as an initial user perception but also as a decisive factor within the structural equation modeling of technology acceptance, particularly in understanding Tokopedia users' behavioral patterns in the Indonesian e-commerce landscape.

2.3 Perceived Ease of Use

Perceived Ease of Use (PEOU) is defined as the extent to which an individual believes that using a particular system can be accomplished easily, without excessive effort or difficulty (Davis, 1989). This concept emphasizes the simplicity and intuitiveness of technological operation, where the easier a system is to understand and use, the greater the likelihood that users will accept and incorporate it into their daily activities. In the context of e-commerce, ease of use can manifest through a simple application interface, clear navigation, and responsive features that allow consumers to achieve their goals without unnecessary effort. Soni and Dubey (2024) highlight that the perception of ease of use is a fundamental factor in enhancing customer experience, as users tend to feel more satisfied when technology can be operated intuitively and efficiently.

Empirical findings by Soni and Dubey (2024) demonstrate that PEOU has a significant influence on the acceptance of AI-powered chatbots in e-commerce marketing. This finding is highly relevant to platforms such as Tokopedia, where consumers who perceive the interface as user-friendly, transactions as seamless, and technology-based services as easily accessible are more likely to continue using the platform. Thus, Perceived Ease of Use not only shapes users' initial perceptions but also acts as a determining factor that strengthens the relationship between Perceived Usefulness (PU) and user satisfaction, ultimately enhancing the acceptance and continued use of e-commerce technologies in Indonesia.

2.4 Attitude Toward Using

Attitude Toward Using (ATU) is defined as an individual's positive or negative feelings toward using a particular system or technology, which ultimately influence behavioral tendencies (Zufiyardi et al., 2021). This attitude results from the interaction of various psychological components (i.e., cognitive, affective, and conative), formed through learning experiences, reinforcement, imitation, and direct engagement (Rohman et al., 2023). Thus, Attitude Toward Using can be understood as a dynamic psychological variable that evolves according to users' experiences in adopting technology. Within the framework of the TAM, this attitude serves as a bridge linking initial perceptions of usefulness and ease of use with the actual behavioral intention to utilize the technology.

Susilo (2022) emphasized that Attitude Toward Using plays a vital role in determining users' behavioral intentions, particularly in e-commerce platforms that incorporate gamification

elements. A positive attitude toward platform use enhances consumers' motivation to make repeat purchases, whereas a negative attitude may diminish such intentions even when the technology employed is relatively advanced. This finding suggests that the success of technology adoption depends not only on technical aspects such as ease of use and perceived usefulness but also on how users evaluate and emotionally respond to their experience with the system. Therefore, Attitude Toward Using becomes a crucial factor that cannot be overlooked in modeling technology acceptance, especially within Indonesia's highly competitive e-commerce landscape.

2.5 Behavioral Intention to Use

Behavioral Intention to Use (BIU) refers to an individual's intention or tendency to use a particular technology within a specific period, driven by desire, motivation, and willingness to continue interacting with the system (Wardani & Putra, 2022). This concept emphasizes that behavioral intention extends beyond actual usage. It represents a psychological commitment underlying one's decision to adopt and engage with technology. For example, the motivation to keep using an application or the willingness to recommend it to others serves as a key indicator of user acceptance levels (Rohman et al., 2023). Thus, Behavioral Intention to Use is viewed as a powerful predictor variable that directly influences actual system usage behavior.

A study by Baso and Daryanti (2022) on e-commerce adoption among MSMEs in Makassar using the TAM framework revealed that behavioral intention plays a significant role in determining the success of digital technology adoption. Their findings affirm that the higher the perceived ease

of use and perceived usefulness, the stronger the individual's intention to consistently use e-commerce platforms. In the context of platforms like Tokopedia, Behavioral Intention to Use reflects consumers' willingness to make repeated transactions, explore new features, and even encourage others to adopt the same services. Therefore, this variable not only bridges perception and action but also serves as a key factor in fostering the sustainability of technology adoption in the digital era.

2.6 Actual Use

Actual Use (AU) represents the extent to which individuals engage in the real, observable use of a technology after forming perceptions of its usefulness, ease of use, and behavioral intention. When users believe that a system is easy to operate and capable of enhancing their productivity, they are more likely to adopt and continue using the technology over time (Heryanta, 2019). Actual Use can be measured through various indicators such as the frequency of user interaction with the application, the diversity of features utilized, and the consistency of usage in daily life. Within the TAM framework, Actual Use serves as the final outcome variable that demonstrates whether users' initial perceptions and intentions have been realized through sustained behavioral engagement (Rifaldi et al., 2021).

Harsanto et al. (2023) emphasized that Actual Use is strongly influenced by Behavioral Intention to Use, which in turn is shaped by Perceived Usefulness and Perceived Ease of Use. Their study on the Plantage.id platform found that when consumers perceive an e-commerce application as efficient, relevant, and supportive of their needs, the intensity of usage increases significantly. In the context of Tokopedia, Actual Use is reflected in

how frequently consumers make transactions, explore additional features, and recommend the application to others. Therefore, Actual Use serves as a crucial indicator of successful technology adoption, illustrating the transformation from intention into sustained, real-world behavior.

2.7 Hypothesis Development

Within the Technology Acceptance Model (TAM) framework introduced by Davis (1989), users' attitudes toward a technology are strongly influenced by Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Logically, when individuals perceive that an application provides tangible benefits in enhancing the efficiency and effectiveness of daily activities, a positive attitude toward using the application is likely to develop. Conversely, if an application is difficult to use, even when beneficial, users tend to resist adopting it. Previous studies support this framework. Lardo et al. (2023) and Prastiawan et al. (2021) found that Perceived Usefulness significantly influences users' positive attitudes toward digital applications. Therefore, the first hypothesis is proposed:

H1: Attitude Toward Using is positively influenced by Perceived Usefulness.

Ease of use also plays a critical role in shaping attitudes. The easier an application is to operate, considering its interface, navigation, and features, the more likely users will develop a positive attitude toward it. Empirical evidence supports this notion. Prastiawan (2023) demonstrated that mobile banking ease of use enhances positive attitudes, while Walean et al. (2025a) observed similar effects among Shopee users. Hence, the second hypothesis is formulated:

H2: Attitude Toward Using is positively influenced by Perceived Ease of Use.

Perceived Ease of Use is logically expected to enhance Perceived Usefulness. Applications that are easy to learn and operate are perceived as more beneficial because users do not expend excessive effort to understand their functionality. This relationship is supported empirically by several studies (e.g., Walean et al., 2025b; Muliadi & Japariato, 2021; Sengkadai & Mandagi, 2025), leading to the third hypothesis:

H3: Perceived Ease of Use positively affects Perceived Usefulness.

A positive attitude toward using an application naturally fosters Behavioral Intention to Use (BIU). Attitude represents a psychological predisposition that guides behavior. If Tokopedia users feel comfortable and satisfied while using the platform, they are more likely to intend to continue using it. Adha and Kusumahadi (2020) confirmed that marketplace users' attitudes significantly affect their behavioral intentions, forming the basis for the fourth hypothesis:

H4: Behavioral Intention to Use is positively influenced by Attitude Toward Using.

Within TAM, behavioral intention serves as a primary predictor of Actual Use (AU). Strong intention generally translates into actual usage. Studies by Heryanta (2019) and Rifaldi et al. (2021) provide evidence that behavioral intention significantly impacts actual usage of digital applications, underpinning the fifth hypothesis:

H5: Actual Use is positively influenced by Behavioral Intention to Use.

Beyond its effect on attitude, Perceived Usefulness can also directly influence behavioral intention. If users perceive Tokopedia as beneficial for their daily activities, they are more likely to intend to use it again. Walean et al. (2024) confirmed that perceived usefulness is positively associated with repeated usage intention, leading to the sixth hypothesis:

H6: Behavioral Intention to Use is positively influenced by Perceived Usefulness.

Perceived Usefulness may further influence Actual Use through both attitude and behavioral intention. The benefits experienced foster a positive attitude, which shapes intention and ultimately drives actual usage. This mechanism was highlighted by Walean et al. (2024), who found that enjoyable experiences with applications increase actual usage through mediated pathways of attitude and intention. Thus, the seventh hypothesis is proposed:

H7: Perceived Usefulness significantly affects Actual Use through Attitude Toward Using and Behavioral Intention to Use.

Similarly, Perceived Ease of Use exerts an indirect effect on Actual Use. Applications that are easy to operate encourage positive attitudes and behavioral intentions, which in turn result in actual usage. Walean et al. (2024) support this argument in the context of e-commerce users, forming the eighth hypothesis.

H8: Perceived Ease of Use significantly affects Actual Use through Attitude Toward Using and Behavioral Intention to Use.

Finally, Perceived Usefulness may also affect Actual Use through the mediation of behavioral intention. When users perceive an application as useful, they form the intention to use it, which is subsequently realized in actual behavior. Walean et al. (2024) emphasize behavioral intention as a key mediator between perceived usefulness and actual usage, leading to the ninth hypothesis. **H9:** Perceived Usefulness significantly affects Actual Use through Behavioral Intention to Use

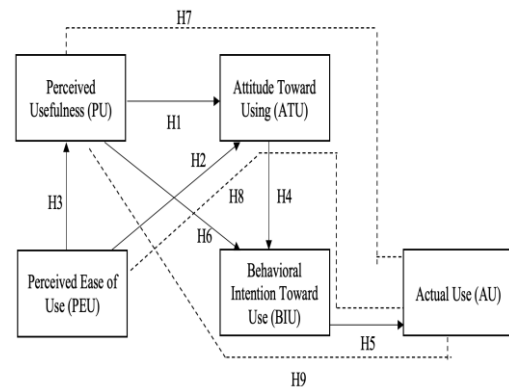


Figure 1. Conceptual Framework

RESEARCH METHOD

3.1 Research Design

This study employs a quantitative research design with an explanatory approach, aiming to analyze the causal relationships among variables in the TAM (i.e., PU, PEOU, ATU, BIU, and AU) among Tokopedia users. This design was chosen because it provides a systematic and measurable representation of the relationships between variables and allows for empirical hypothesis testing using SEM based on Partial Least Squares (PLS). Through this approach, the study is expected to generate valid and reliable findings regarding the factors influencing e-commerce technology acceptance in Indonesia, while also contributing both theoretically and practically to the literature on technology adoption and digital business strategy.

3.2 Population and Sample

The population of this study comprises all Tokopedia users in Indonesia. The sample size was determined based on several methodological guidelines. Kerlinger and Lee (2000) suggest that the minimum sample for quantitative research is 30 respondents, while Hair et al. (2019) recommend a minimum of five times the number of research indicators. Given that this study includes 26 indicators, the minimum required sample is 130 respondents. This study employs a non-probability sampling technique using purposive sampling, in which respondents are selected based on specific criteria. The selected respondents are active Tokopedia users to ensure that the collected data are relevant and representative of the study objectives (Sugiyono, 2007).

3.3 Research Instrument

The research instrument used in this study was an online questionnaire developed through the Google Form platform. The questionnaire was designed to represent each variable within the Technology Acceptance Model (TAM), namely Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Using (ATU), Behavioral Intention to Use (BIU), and Actual Use (AU). Each variable indicator was translated into relevant statements to allow for quantitative measurement. A five-point Likert scale was employed, consisting of the options: Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree, with scores ranging from 1 to 5. This scale was selected because it provides measurable variation in responses and facilitates statistical data analysis. The instrument was developed with attention to language clarity, indicator relevance, and alignment with the research

objectives to ensure the collection of valid and reliable data for supporting hypothesis testing.

3.4 Data Collection

In this study, the researcher used primary data collected through an online questionnaire administered via the Google Form platform. According to Sugiyono (2007), primary data are obtained directly from first-hand sources using research instruments, while secondary data are collected from pre-existing sources. The questionnaire was developed based on the variable indicators within the Technology Acceptance Model (TAM) and was designed to explore respondents' perceptions, attitudes, and behaviors regarding the use of the Tokopedia application. The questionnaire was systematically distributed through various digital channels over a period of 31 days, from March 3, 2025, to April 3, 2025, with the aim of obtaining representative data suitable for the study's analytical needs.

3.5 Data Analysis

The data analysis in this study employed Structural Equation Modeling–Partial Least Squares (SEM–PLS) using the SmartPLS software. The analysis was conducted in three main stages: evaluation of the outer model (measurement model), evaluation of the inner model (structural model), and hypothesis testing.

The first stage, outer model evaluation, assessed the quality of the indicators in terms of convergent validity, discriminant validity, and construct reliability. Convergent validity was evaluated using outer loadings and Average Variance Extracted (AVE). An indicator was considered valid if its outer loading was greater than or equal to 0.70, while an AVE value of at least 0.50

indicated that the construct explained more than half of the variance of its indicators. Discriminant validity was assessed using two approaches: the Fornell–Larcker criterion and cross loadings. According to the Fornell–Larcker criterion, the square root of each construct’s AVE should be higher than its correlations with other constructs. In cross-loading assessment, an indicator was considered valid if its loading on its own construct was higher than on any other construct. After establishing validity, construct reliability was assessed using Cronbach’s Alpha and Composite Reliability, both of which had to exceed 0.70 to indicate reliability.

The second stage, inner model evaluation, aimed to examine the predictive strength and relationships among latent constructs. First, the coefficient of determination (R^2) was calculated to determine how well exogenous variables explained endogenous variables. Following Hair et al. (2019), R^2 values of 0.75, 0.50, and 0.25 were interpreted as strong, moderate, and weak, respectively. Next, effect size (f^2) was calculated to assess the relative contribution of each exogenous variable to the endogenous variable, with interpretations of 0.02 (small), 0.15 (medium), and 0.35 (large). Predictive relevance (Q^2) was evaluated using the blindfolding technique, where Q^2 values greater than zero indicate predictive relevance. Overall model fit was assessed using Standardized Root Mean Square Residual (SRMR) and Normed Fit Index (NFI), with $SRMR \leq 0.08$ and $NFI \geq 0.80$ indicating a good model fit.

The final stage involved hypothesis testing using the bootstrapping method in SmartPLS to obtain path coefficients, t-statistics, and p-values. Hypotheses were accepted if $t \geq 1.96$ and $p \leq 0.05$ at a 5% significance level; otherwise, they were rejected. This process allowed for empirical evaluation of the proposed relationships among the variables in the study’s conceptual framework.

Through these stages, SmartPLS provided a comprehensive assessment of instrument quality, structural model strength, and hypothesis validity. Consequently, the analysis not only determined whether relationships among variables were significant but also evaluated the predictive capability of the research model.

4. Results and Discussions

4.1 Respondent Demographic Profile

From the questionnaire distribution, a total of 261 respondents participated, exceeding the previously determined minimum sample size. Of these respondents, 54% (141 individuals) were female, and 46% (120 individuals) were male. The largest age group was 46–55 years, comprising 110 respondents or 42%, while the smallest age group was under 26 years, accounting for 36 respondents or 14%. In terms of education, the majority of respondents held a Bachelor’s degree (S1), totaling 148 individuals or 57%, whereas the smallest proportion held a Diploma III (D3), with 18 respondents or 7%.

Table 1. Respondent Profile

Description	Total	%
Gender		
Male	120	46%
Female	141	54%
Age		

<26	36	14%
26–35	46	18%
36–45	69	26%
46–55	110	42%
>65	0	0%
Education Level		
High School	34	13%
Diploma (D3)	18	7%
Bachelor's Degree (S1)	148	57%
Postgraduate	61	23%

4.2 Measurement Model (Outer Model)

4.2.1. Convergent Validity

Table 2 and figure 2 present the indicators for attitude toward using, actual use, behavioral intention to use, perceived ease of use, and perceived usefulness. The convergent validity of each item was assessed by examining the

factor loadings, which should exceed 0.70, and the AVE, which should be greater than 0.50. Based on the analyzed data, several indicators did not meet these criteria, namely ATU4, ATU5, AU2, and AU4. After eliminating these items, the remaining indicators satisfied the validity standards and adequately represented the constructs relevant to the study objectives.

Table 2. Convergent Validity

Indicator	ATU	AU	BIU	PEU	PU	AVE
Attitude Toward Using						0.830
ATU1	0.916					
ATU2	0.889					
ATU3	0.918					
ATU4	0.921					
Actual Use						0.732
AU1		0.919				
AU3		0.741				
AU5		0.896				
Behavioral Intention to Use						0.720
BIU1			0.862			
BIU2			0.830			
BIU3			0.854			
BIU4			0.838			
BIU5			0.858			
Perceived Ease of Use						0.842
PEU1				0.923		
PEU2				0.935		
PEU3				0.955		
PEU4				0.855		
Perceived Usefulness						0.694
PU1					0.801	

PU2	0.795
PU3	0.850
PU4	0.863
PU5	0.860
PU6	0.826

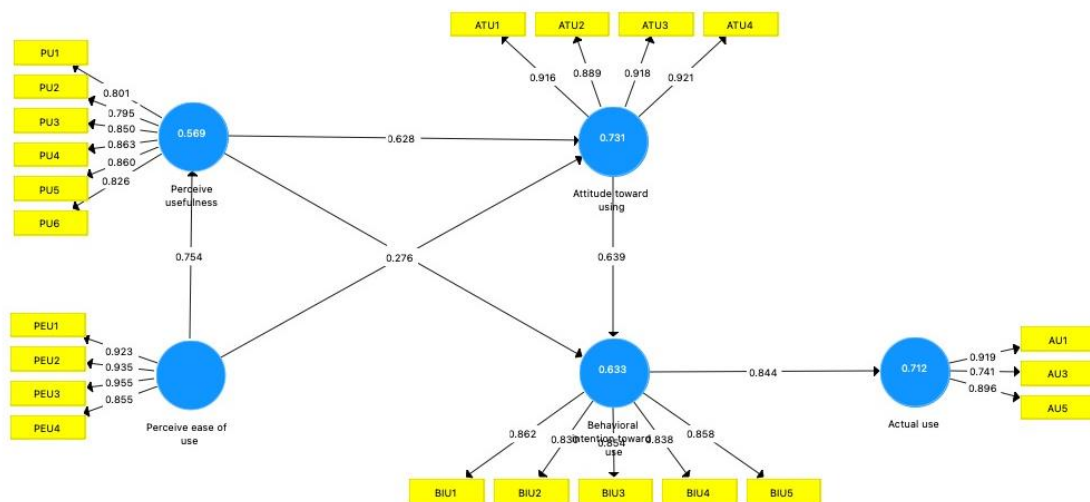


Figure 2. Measurement Model

4.2.1. Convergent Validity

Based on the Fornell-Larcker Criterion results presented in Table 3, the square roots of the AVE on the diagonal (AU = 0.856; ATU = 0.911; BIU = 0.848; PEU = 0.918; PU = 0.833) are greater than the correlations between constructs on the off-diagonal. This indicates that each construct in the study is distinct from the other constructs. Although the correlation between PU

and ATU approaches the square root of AVE ($0.836 < 0.833$), this value remains within the acceptable tolerance limit as suggested by Henseler et al. (2015), confirming that discriminant validity is still maintained. Therefore, it can be concluded that the research instrument demonstrates good discriminant validity and is appropriate for accurately measuring the constructs under investigation.

Table 3. Fornell-Larcker Criterion

	AU	ATU	BIU	PEU	PU
AU	0.856				
ATU	0.787	0.911			
BIU	0.844	0.790	0.848		
PEU	0.684	0.749	0.654	0.918	
PU	0.707	0.836	0.714	0.754	0.833

To further ensure the robustness of the measurement model, cross-loading values were also examined. The results in table 4 indicated that each

indicator loaded more strongly on its respective construct than on any other construct, with all loadings exceeding the required threshold of 0.70, as

presented in the table below. This finding reinforces the discriminant validity of the research instrument.

Tabel 4. Cross Loading

	AU	ATU	BIU	PEU	PU
ATU1	0.737	0.916	0.727	0.714	0.768
ATU2	0.664	0.889	0.683	0.681	0.772
ATU3	0.701	0.918	0.720	0.643	0.747
ATU4	0.764	0.921	0.748	0.691	0.759
AU1	0.919	0.718	0.808	0.638	0.650
AU3	0.741	0.461	0.581	0.339	0.409
AU5	0.896	0.805	0.755	0.732	0.722
BIU1	0.789	0.814	0.862	0.712	0.720
BIU2	0.675	0.615	0.830	0.487	0.591
BIU3	0.698	0.649	0.854	0.559	0.601
BIU4	0.679	0.559	0.838	0.453	0.510
BIU5	0.723	0.679	0.858	0.529	0.583
PEU1	0.612	0.679	0.609	0.923	0.674
PEU2	0.596	0.666	0.562	0.935	0.681
PEU3	0.645	0.697	0.621	0.955	0.723
PEU4	0.654	0.705	0.607	0.855	0.687
PU1	0.556	0.636	0.593	0.638	0.801
PU2	0.514	0.660	0.550	0.507	0.795
PU3	0.585	0.679	0.590	0.611	0.850
PU4	0.647	0.694	0.570	0.651	0.863
PU5	0.633	0.752	0.637	0.706	0.860
PU6	0.590	0.747	0.624	0.640	0.826

4.2.2. Reliability Test

After confirming the validity of the variables and indicators, the reliability of each construct was assessed. This was done by examining the Cronbach's Alpha and Composite

Reliability values, with both required to exceed 0.70. As shown in the table 5, all constructs have Cronbach's Alpha and Composite Reliability values above 0.70, indicating that the variables used in this study are reliable.

Table 5. Construct Reliability

	Cronbach's Alpha	Composite Reliability	Results
AU	0.814	0.891	Reliable
ATU	0.932	0.951	Reliable
BIU	0.903	0.928	Reliable
PEU	0.937	0.955	Reliable
PU	0.912	0.931	Reliable

4.3 Structural Model (Inner Model)

4.3.1 Coefficient of Determination (R^2)

Table 6 presents the R^2 values of the structural model. Perceived

Usefulness (PU) is explained by Perceived Ease of Use (PEU) at 56.9%, indicating a moderate effect. Behavioral Intention to Use (BIU) is explained by PEU, PU, and Attitude Toward Using (ATU) at 63.3%, also indicating a moderate effect. Meanwhile, Attitude

Toward Using (ATU) is explained by PEU and PU at 73.1%, demonstrating a moderate effect as well. These results suggest that the exogenous variables moderately predict the respective endogenous constructs in the model.

Table 6. Coefficient of Determination

Variable	R Square
Actual use	0.712
Attitude toward using	0.731
Behavioral intention toward use	0.633
Perceive usefulness	0.569

4.3.2. Effect Size (F^2)

Based on the result in Table 7, the effect size (f^2) can be interpreted according to the established criteria, where values greater than 0.35 indicate a large effect. The relationships from BIU to AU, PU to ATU, and PEU to PU fall into this category, demonstrating a large

effect. The path from ATU to BIU is categorized as having a moderate effect, while PEU to ATU and PU to BIU are considered to have small effects. These results highlight the varying contributions of exogenous constructs to their respective endogenous variables in the structural model.

Table 7. Effect size (F^2)

	AU	ATU	BIU	PEU	PU
AU					
ATU			0.336		
BIU	2.467				
PEU		0.122			1.320
PU		0.632	0.027		

4.3.3. Model Fit (NFI)

Based on Table 8, the effect size (f^2) can be interpreted according to established criteria, where values greater than 0.35 indicate a large effect. The relationships from Behavioral Intention to Use to Actual Use, Perceived Usefulness to Attitude Toward Using.

Table 8. Fit Model

Fit Model	Value
NFI	0,859
rms Theta	0,158

4.3.4. Predictive Relevance (Q^2)

Based on the results in Table 9, the effect size (f^2) can be interpreted according to the established criteria, where values greater than 0.35 indicate a large effect. The relationships from BIU to AU, PU to ATU, and PEU to PU fall into this category, demonstrating a large effect. The path from ATU to BIU is categorized as having a moderate effect, while PEU to ATU and PU to BIU are considered to have small effects. These findings illustrate the varying contributions of exogenous constructs to their respective endogenous constructs within the structural model.

Table 9. Predictive Relevance Q^2

SSO	SSE	$Q^2 (=1-SSE/SSO)$
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AU	783.000	381.225	0.513
ATU	1044.000	416.394	0.601
BIU	1305.000	727.616	0.442
PEU	1044.000	1044.000	
PU	1566.000	960.932	0.386

4.4 Hypothesis Test

The T-statistical test was conducted to determine the significance of the relationships among latent variables in the research model. According to Hair et al. (2019), T-statistics are used to test hypotheses by comparing the calculated T-statistic values with the critical T-table values at a specified significance level. At a 5% significance level ($\alpha = 0.05$), a

hypothesis is considered significant if the T-statistic exceeds 1.96, while at a 1% significance level ($\alpha = 0.01$), significance is achieved if the T-statistic exceeds 2.58. Therefore, the results of the T-statistical test provide empirical evidence regarding whether the paths among constructs in the structural model have a significant effect. The results of this analysis are presented in the table 10.

Table 10. Hypothesis Testing

	T Statistics (O/STDEV)	P Values
PU -> ATU	11.052	0.000
PEU -> ATU	4.462	0.000
PEU -> PU	18.518	0.000
ATU -> BIU	8.522	0.000
BIU -> AU	46.425	0.000
PU -> BIU	2.307	0.021
PU -> ATU -> BIU -> AU	6.361	0.000
PEU -> ATU -> BIU -> AU	3.772	0.000
PU -> BIU -> AU	2.296	0.022

Based on the results of the hypothesis testing presented in Table 10, all paths among the variables in the research model were found to be significant, as the T-statistics exceeded 1.96 and the P-values were below 0.05. The analysis shows that Perceived Usefulness (PU) has a significant effect on Attitude Toward Using (ATU) ($T = 11.052$; $P = 0.000$) and Behavioral Intention to Use (BIU) ($T = 2.307$; $P = 0.021$), while Perceived Ease of Use (PEU) significantly influences ATU ($T = 4.462$; $P = 0.000$) and PU ($T = 18.518$; $P = 0.000$). Furthermore, ATU significantly affects BIU ($T = 8.522$; $P = 0.000$), and BIU exerts a very strong

influence on Actual Use (AU) ($T = 46.425$; $P = 0.000$).

Mediation analysis also yielded significant results, including $PU \rightarrow ATU \rightarrow BIU \rightarrow AU$ ($T = 6.361$; $P = 0.000$), $PEU \rightarrow ATU \rightarrow BIU \rightarrow AU$ ($T = 3.772$; $P = 0.000$), and $PU \rightarrow BIU \rightarrow AU$ ($T = 2.296$; $P = 0.022$), indicating that indirect effects further strengthen the relationships among constructs. Therefore, all research hypotheses are accepted, confirming that perceived ease of use and perceived usefulness play crucial roles in shaping users' attitudes and behavioral intentions, which ultimately drive the actual use of the Tokopedia application. The overall

results of the structural model are illustrated in Figure 3.

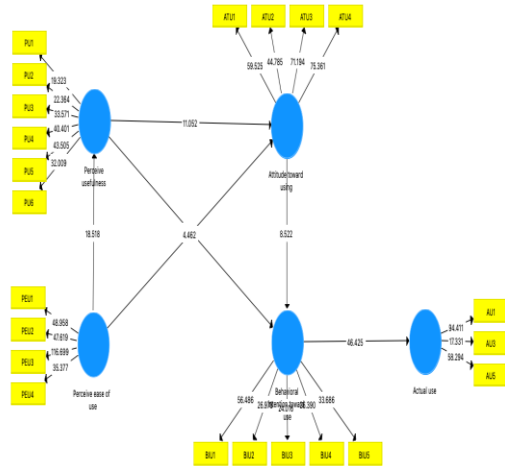


Figure 3. Structural Model Estimation

The structural model of this study, illustrated in Figure 3, presents the path coefficients among variables and the outer loadings of each construct with its indicators. The analysis produced the following structural equations, which explain the influence of exogenous variables on endogenous variables: Perceived Usefulness (PU) = $0.754 \times$ Perceived Ease of Use (PEU); Attitude Toward Using (ATU) = $0.276 \times$ PEU + $0.628 \times$ PU; Behavioral Intention to Use (BIU) = $0.181 \times$ PU + $0.639 \times$ ATU; and Actual Use (AU) = $0.844 \times$ BIU. These equations indicate that each variable within the Technology Acceptance Model (TAM) plays a significant role in shaping causal relationships and explaining technology acceptance among Tokopedia users.

The results in Table 10 show a significant relationship between Perceived Usefulness and Attitude Toward Using, with a T-value of 11.052 and a p-value of 0.000, confirming H1. This suggests that Tokopedia users perceive the application as beneficial in facilitating their activities, leading to a positive attitude toward its use. Similarly, Perceived Ease of Use significantly affects ATU (T = 4.462; P

= 0.000), supporting H2. Users find the application easy to operate, which fosters a favorable attitude and enhances their acceptance of the platform. Furthermore, PEU has a significant positive effect on PU (T = 18.518; P = 0.000), confirming H3. This indicates that users perceive Tokopedia as useful because it is easy to navigate and operate, allowing for effective adaptation, clarity, and skill development during usage. ATU also significantly influences Behavioral Intention to Use (T = 8.522; P = 0.000), supporting H4. Users who hold a positive attitude toward the application demonstrate a stronger intention to continue using it, reinforced by positive experiences and perceptions of enjoyment.

Behavioral Intention to Use strongly predicts Actual Use (T = 46.425; P = 0.000), confirming H5. This finding suggests that users with strong behavioral intentions consistently engage with the application in daily activities, using it according to their needs and work-related tasks. Additionally, PU has a direct positive effect on BIU (T = 2.307; P = 0.021), supporting H6. Users recognize the utility of Tokopedia for everyday activities, which motivates repeated engagement with the platform. Mediation analysis further reveals significant indirect effects. PU influences AU through ATU and BIU (T = 6.361; P = 0.000), confirming H7, indicating that positive attitudes and behavioral intentions mediate the effect of perceived usefulness on actual usage. PEU also significantly affects AU through ATU and BIU, supporting H8, demonstrating that ease of use indirectly promotes actual use via positive attitudes and intentions. Lastly, PU affects AU through BIU (T = 2.296; P = 0.022), confirming H9, showing that behavioral

intention mediates the relationship between perceived usefulness and actual use.

Table 11. Total, Direct and Indirect Effect

	Total Effects	Direct Effects	Indirect Effects
ATU -> BIU	0.639	0.639	
BIU -> AU	0.844	0.844	
PEU -> ATU	0.519	0.276	0.474
PEU -> PU	0.754	0.754	
PU -> ATU	0.628	0.628	
PU -> BIU	0.582	0.181	0.401
PU -> ATU -> BIU -> AU	0.338		0.338
PEU -> ATU -> BIU -> AU	0.148		0.148
PU -> BIU -> AU	0.152		0.152

The results for the indirect effect as shown in the table 11 indicates that the largest effect comes from the path of Behavioral Intention to Use (BIU) to Actual Use (AU), with a coefficient of 0.844, while the smallest effect is observed from the path of Perceived Ease of Use (PEU) through Attitude Toward Using (ATU) and BIU to AU, with a coefficient of 0.148. The direct effect of BIU on AU (0.844) is the most significant, whereas the smallest direct effect is from Perceived Usefulness (PU) to BIU (0.181). These findings indicate that when users feel comfortable and respond positively to their experience with an application, they are more likely to use it repeatedly.

Furthermore, the indirect path of PU through ATU to BIU and AU has a coefficient of 0.338. This suggests that when users perceive Tokopedia as useful and respond positively to this experience, they are more likely to continue using the application in the future, leading to increased usage intensity. This is consistent with the PU to BIU to AU path, which has a coefficient of 0.152, further highlighting the role of perceived usefulness in

shaping user intention and actual behavior.

4.5. Discussion

The findings of this study demonstrate that all constructs within the TAM (i.e., Perceived Usefulness, Perceived Ease of Use, Attitude Toward Using, Behavioral Intention to Use, and Actual Use), significantly explain technology acceptance among Tokopedia users in Indonesia. This is consistent with the foundational TAM theory proposed by Davis (1989), which asserts that PU and PEOU are primary determinants of users' attitudes and behavioral intentions toward technology. In the present study, structural equation modeling revealed that PEOU has a direct influence on both PU and ATU, which subsequently impact BIU and ultimately lead to AU. These findings are aligned with previous research indicating that the perceived ease of use and perceived usefulness of e-commerce platforms encourage positive attitudes, stronger behavioral intentions, and higher actual usage rates (Rohman et al., 2021; Susilo, 2022; Harsanto et al., 2023).

Perceived Usefulness emerged as a particularly influential factor,

consistent with prior studies emphasizing its role in enhancing user performance and satisfaction (Sinaga et al., 2021; Wonglimpiyarat, 2017). In the context of Tokopedia, PU manifests through consumers' ability to find products efficiently, save time during shopping, conduct faster transactions, and access convenient payment methods. These tangible benefits positively shape users' attitudes toward the application (ATU), reinforcing the notion that PU functions not merely as an initial perception but as a critical determinant of sustained usage behavior (Rohman et al., 2021). The results also confirm that PU directly influences BIU, supporting prior findings that the perception of usefulness strengthens users' intention to continue interacting with e-commerce platforms (Walean et al., 2024).

Similarly, Perceived Ease of Use significantly affects both PU and ATU, echoing the arguments of Davis (1989) and empirical evidence from Soni and Dubey (2024). An application perceived as easy to navigate and intuitive enhances users' positive attitudes and, in turn, reinforces the perceived benefits of using the system. In e-commerce platforms like Tokopedia, this ease of operation translates into a greater willingness to explore features, complete transactions, and maintain continued engagement. Thus, PEOU not only strengthens PU but also indirectly contributes to higher levels of BIU and AU, highlighting the interdependent nature of these constructs in fostering technology adoption.

Attitude Toward Using (ATU) was confirmed as a crucial mediator linking initial perceptions of usefulness and ease of use with Behavioral Intention to Use. This finding aligns with prior studies emphasizing ATU's dynamic role in shaping users'

psychological disposition toward technology adoption (Zufiyardi et al., 2021; Rohman et al., 2023; Susilo, 2022). A positive attitude toward using Tokopedia fosters a strong BIU, indicating that consumers who enjoy and value their experience are more likely to continue interacting with the platform. Moreover, the significant effect of BIU on Actual Use supports TAM's predictive framework, where intention serves as the immediate precursor to real-world behavior (Heryanta, 2019; Rifaldi et al., 2021; Baso & Daryanti, 2022). In practical terms, Tokopedia users who perceive the platform as beneficial and easy to use are motivated to engage in repeated transactions, explore new features, and even recommend the application to others.

Additionally, the study confirmed the significance of mediated pathways. PU influences AU through ATU and BIU, while PEOU indirectly affects AU via the same mediators. These findings echo Walean et al.'s (2024) results, highlighting that enjoyable and efficient experiences with a platform amplify actual usage through both attitudinal and intentional pathways. This emphasizes that user engagement is not a simple linear process but rather a cumulative effect of perceived benefits, ease of use, and attitudinal responses.

From a practical perspective, these results offer strategic insights for Tokopedia. Enhancing the platform's usability and emphasizing features that deliver tangible benefits can strengthen positive attitudes, boost behavioral intentions, and increase actual usage, thereby fostering user loyalty. The findings also reinforce the relevance of TAM in the Indonesian e-commerce context, showing that despite evolving consumer behaviors and technological advances, PU and PEOU remain central

to predicting adoption patterns. Collectively, this study bridges theoretical understanding with actionable recommendations, demonstrating how TAM constructs can inform both academic research and practical decision-making in digital commerce.

CONCLUSIONS

This study aims to analyze technology acceptance among Tokopedia users in Indonesia using the TAM framework. The results indicate that all primary TAM constructs (i.e., PU, PEOU, ATU, BIU, and AU), significantly explain user behavior on the Tokopedia platform. Perceived Ease of Use was found to influence both Perceived Usefulness and Attitude Toward Using, while Perceived Usefulness, together with Attitude Toward Using, significantly affects Behavioral Intention to Use, which in turn positively impacts Actual Use. These findings support the conceptual TAM framework and reinforce prior research on technology adoption in the e-commerce context.

The implications of this study can be viewed from both theoretical and practical perspectives. Theoretically, it enriches the literature on technology acceptance by confirming the relevance of TAM in the Indonesian e-commerce context, particularly on the Tokopedia platform. The findings emphasize that users' perceptions of usefulness and ease of use are key determinants of positive attitudes and behavioral intentions toward digital applications. Practically, the study provides valuable insights for Tokopedia's management, highlighting the importance of continuously improving platform features that facilitate navigation, accelerate transactions, and deliver tangible

benefits to users, thereby enhancing satisfaction and fostering user loyalty.

Nevertheless, this study has certain limitations. First, the sample was restricted to Tokopedia users within a specific period, limiting the generalizability of the findings to the broader population of e-commerce users in Indonesia. Second, the study focused solely on TAM variables without incorporating external factors such as trust, perceived risk, or social influence, which may also affect technology acceptance. Future research is recommended to expand the sample size, compare multiple e-commerce platforms, and include additional variables beyond TAM to provide a more comprehensive understanding of user behavior in digital technology adoption.

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