



Explaining Post-Purchase Behavior in E-commerce: The Roles of Consumer Awareness, Perceived Risk, and Satisfaction

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ABSTRACT

The rapid growth of e-commerce platforms has shifted managerial focus from customer acquisition to customer retention and post-purchase behavior. Although prior studies have extensively examined pre-purchase intentions, limited research explains how post-purchase evaluations are shaped by technology perceptions, perceived risk, and consumer awareness within an integrated framework. This study addresses this gap by developing and testing a research model that combines the Technology Acceptance Model (TAM), Perceived Risk Theory, and Expectation-Confirmation Theory in the context of e-commerce platforms. Survey data were collected from 410 consumers with actual online shopping experience and analyzed using partial least squares structural equation modeling (PLS-SEM). Perceived risk is conceptualized as a second-order multidimensional construct. The results show that consumer awareness significantly reduces perceived risk and directly enhances post-purchase satisfaction. Perceived ease of use positively influences perceived usefulness, while perceived usefulness and customer satisfaction significantly drive satisfaction and repurchase intention, respectively. However, the effects of perceived risk on perceived usefulness and perceived ease of use on satisfaction are not supported. This study extends TAM to the post-purchase stage, refines the role of perceived risk in e-commerce, and highlights consumer awareness as a key determinant of post-purchase satisfaction. The findings offer important implications for e-commerce platforms aiming to strengthen customer retention and long-term sustainability.

1. Introduction

The rapid growth of e-commerce platforms has fundamentally transformed consumer purchasing behavior worldwide. In recent years, online marketplaces such as Shopee, Lazada, and Tiki have become dominant retail channels, particularly in emerging markets where digital adoption is accelerating. As competition among e-commerce platforms intensifies, attracting new customers is no longer sufficient to sustain long-term success. Instead, retaining existing customers and encouraging favorable post-purchase behaviors—most notably repurchase intention and continued platform usage—have emerged as critical determinants of platform competitiveness [1,2].

Prior research in e-commerce has extensively examined pre-purchase behavior, focusing primarily on consumers' initial adoption, purchase intention, or technology acceptance [3,4]. The Technology Acceptance Model (TAM) has been widely applied to explain how perceived usefulness and perceived ease of use shape users' intentions toward information systems and online platforms. However, an increasing body of literature argues that consumer behavior does not end at the point of purchase, especially in digital environments where post-purchase experiences critically influence future behavioral outcomes [5,1]. Despite this recognition, empirical studies that extend TAM to explain post-purchase behavior—particularly repurchase intention—in e-commerce contexts remain relatively limited.

Beyond technology-related perceptions, online consumers are exposed to substantial perceived risks, including financial loss, privacy invasion, security threats, psychological discomfort, and time loss. According to Bauer [6] and Cunningham [7], consumer decision-making is influenced not only by expected benefits but also by uncertainty and potential negative consequences associated with a transaction. Prior studies have shown that perceived risk undermines trust, satisfaction, and purchase intention in e-commerce settings [8,9]. Nevertheless, most existing research conceptualizes perceived risk as a single-dimensional construct and concentrates on the pre-purchase stage, thereby overlooking its multidimensional nature and its potential impact on post-purchase evaluations and behavioral intentions.

Customer satisfaction has also been consistently identified as a central determinant of post-purchase behavior. Drawing on Expectation–Confirmation Theory (ECT), Oliver [5] and Bhattacharjee [1] argued that satisfaction reflects the extent to which consumers' post-purchase experiences confirm or exceed their initial expectations, subsequently shaping continuance intention and repurchase behavior. In e-commerce environments, satisfaction represents consumers' holistic evaluation of platform performance, encompassing system usability, transaction security, and service reliability. However, limited studies have simultaneously integrated satisfaction with both technology acceptance beliefs and perceived risk within a unified framework to explain post-purchase behavior.

Moreover, consumer awareness—defined as the extent to which consumers are informed about platform features, operational mechanisms, policies, and potential risks—plays an important yet underexplored role in e-commerce research. Greater awareness may reduce uncertainty, mitigate perceived risk, and enhance consumers' evaluations of perceived usefulness and perceived ease of use [10,11]. Despite its theoretical relevance, awareness is often treated as a peripheral variable or omitted altogether in models of post-purchase behavior. Beyond its role in mitigating perceived risk, higher consumer awareness may also directly enhance post-purchase satisfaction by reinforcing consumers' confidence, sense of control, and evaluative certainty during and after the online transaction process.

In response to these gaps, this study develops and empirically tests an integrated research model to explain post-purchase behavior on e-commerce platforms by synthesizing the Technology Acceptance Model, Perceived Risk Theory, and Expectation–Confirmation Theory. Specifically, perceived risk is conceptualized as a second-order multidimensional construct, and the study examines how perceived risk and consumer awareness influence perceived ease of use, customer

satisfaction, and ultimately repurchase intention among consumers with actual online purchasing experience. By shifting the analytical focus from pre-purchase intentions to post-purchase behavioral outcomes, this study advances the existing e-commerce literature.

This research offers several contributions. First, it extends TAM beyond initial adoption by applying it to the post-purchase stage in e-commerce contexts. Second, it advances perceived risk research by modeling perceived risk as a multidimensional second-order construct and examining its indirect effects on repurchase intention through technology perceptions and satisfaction. Third, it highlights the role of consumer awareness as a key antecedent that reduces perceived risk and enhances post-purchase evaluations. Finally, by providing empirical evidence from an emerging e-commerce market, this study yields meaningful managerial implications for e-commerce platforms seeking to strengthen customer retention and achieve long-term sustainability.

2. Literature Review and Hypotheses Development

2.1 Technology Acceptance Model and Post-purchase Behavior

The Technology Acceptance Model (TAM), originally proposed by Davis [3], posits that individuals' acceptance and use of information systems are primarily determined by perceived usefulness (PU) and perceived ease of use (PEOU). Perceived usefulness refers to the extent to which a user believes that using a system enhances task performance, whereas perceived ease of use reflects the degree to which a system is perceived as effortless to use. TAM has been extensively validated across a wide range of information systems, including e-commerce and online service platforms [4,12].

Although TAM was initially developed to explain technology adoption and initial usage, subsequent research suggests that its core constructs remain salient beyond the pre-adoption stage. In digital consumption contexts, consumers continuously reassess system usefulness and usability based on their actual usage and transaction experiences [2,13,14]. In the post-purchase stage, these evaluations become particularly important, as they shape users' satisfaction and future behavioral intentions toward the platform.

According to TAM, Davis [3] argued that perceived ease of use exerts a positive influence on perceived usefulness because systems that are easier to use enable users to accomplish tasks more efficiently and with less cognitive effort. This relationship has been consistently supported in e-commerce and online shopping environments [9,12]. Therefore, this study proposes the following hypothesis:

H1: Perceived ease of use has a positive effect on perceived usefulness.

2.2. Perceived Risk Theory in E-commerce

Bauer [6] first proposed Perceived Risk Theory, arguing that consumer decision-making is influenced not only by expected benefits but also by uncertainty and the potential for negative outcomes associated with a transaction. Cunningham [7] further expanded this perspective by emphasizing the multidimensional nature of perceived risk in consumer behavior. In e-commerce environments, perceived risk is typically higher than in traditional retail settings due to the absence of physical

interaction, information asymmetry, and concerns related to payment security, privacy protection, and service reliability.

Prior research conceptualizes perceived risk as a multidimensional construct encompassing financial risk, privacy risk, security risk, psychological risk, and time risk [8,15]. These risk dimensions collectively shape consumers' evaluations of online platforms and influence how they perceive system usability and value.

Empirical studies suggest that higher levels of perceived risk increase consumers' cognitive burden and anxiety during online transactions, thereby reducing perceived ease of use [8,14]. Similarly, perceived risk undermines perceived usefulness by diminishing consumers' confidence in the benefits and effectiveness of using an e-commerce platform [9,16]. In the post-purchase stage, such risk perceptions continue to influence consumers' evaluations of the platform based on their transaction outcomes and experiences. Accordingly, this study conceptualizes perceived risk as a second-order construct and proposes that it negatively influences consumers' technology perceptions after purchase:

H2: Perceived risk has a negative effect on perceived ease of use.

H3: Perceived risk has a negative effect on perceived usefulness.

2.3. Consumer Awareness and Risk Reduction

Consumer awareness refers to the extent to which consumers are informed about e-commerce platform features, transaction procedures, policies, and potential risks associated with online shopping. Drawing on Information Processing Theory, Bettman [17] argued that greater awareness enables consumers to process information more effectively, reduce uncertainty, and make more informed evaluations. This perspective has also been supported in technology adoption research [18].

In e-commerce contexts, higher consumer awareness has been shown to mitigate perceived risk by enhancing transparency and improving consumers' understanding of platform mechanisms and safeguards [10,11]. Well-informed consumers are less likely to perceive online transactions as uncertain or threatening because they possess greater knowledge of how transactions are conducted and how potential problems are addressed. Based on these arguments, this study proposes that consumer awareness plays a critical role in reducing perceived risk during the post-purchase stage:

H4: Consumer awareness has a negative effect on perceived risk.

2.4. Consumer Awareness and Post-purchase Satisfaction

Beyond its role in reducing uncertainty and perceived risk, consumer awareness may also influence consumers' affective evaluations after purchase [10,11]. In post-purchase contexts, Oliver [5] argued that satisfaction reflects consumers' overall assessment of whether their transaction experience meets expectations and provides a sense of confidence and control.

Consumers with higher levels of awareness are better equipped to interpret transaction outcomes, evaluate platform performance, and cope with minor service issues. As a result, they are more likely

to experience reassurance and evaluative certainty during and after the transaction process. This enhanced sense of control and confidence can directly contribute to higher levels of post-purchase satisfaction, even when minor inconveniences occur. Accordingly, this study proposes the following hypothesis:

H5: Consumer awareness has a positive effect on customer satisfaction.

2.5. Technology Perceptions, Satisfaction, and Repurchase Intention

Oliver [5] proposed Expectation–Confirmation Theory, which posits that customer satisfaction arises from the comparison between pre-purchase expectations and post-purchase performance perceptions. Building upon this theoretical foundation, Bhattacharjee [1] extended the model to post-adoption information systems contexts, arguing that satisfaction subsequently influences continuance intention and repurchase behavior.

In e-commerce settings, perceived ease of use and perceived usefulness constitute key components of consumers' post-purchase evaluations. Platforms that are easy to navigate and perceived as useful in facilitating efficient transactions enhance consumers' shopping experiences and contribute to higher satisfaction levels [2,13].

Furthermore, platforms that are perceived as easy to use reduce consumers' cognitive effort and enhance the overall shopping experience, thereby increasing post-purchase satisfaction [2,13]. Therefore, the following hypothesis is proposed:

H6: Perceived ease of use has a positive effect on customer satisfaction.

H7: Perceived usefulness has a positive effect on customer satisfaction.

H8: Customer satisfaction has a positive effect on repurchase intention.

2.6. Summary of the Hypotheses

In summary, this study integrates the Technology Acceptance Model, Perceived Risk Theory, and Expectation–Confirmation Theory to explain post-purchase behavior on e-commerce platforms. The proposed research model examines how consumer awareness and perceived risk shape technology perceptions, satisfaction, and ultimately repurchase intention in a post-purchase context.

3. Research Model and Methodology

3.1. Research Model

Based on the theoretical foundations of the TAM, Perceived Risk Theory, and ECT, this study proposes an integrated research model to explain post-purchase behavior on e-commerce platforms. The model focuses on consumers who have prior purchasing experience and examines how consumer awareness and perceived risk shape technology perceptions, customer satisfaction, and repurchase intention.

Specifically, consumer awareness is posited as an antecedent that reduces perceived risk and directly enhances post-purchase satisfaction. Perceived risk is conceptualized as a second-order construct reflecting multiple dimensions of risk commonly encountered in e-commerce transactions. In line

with TAM, perceived ease of use influences perceived usefulness, and both technology perceptions are expected to enhance customer satisfaction. Finally, drawing on ECT, customer satisfaction is hypothesized to drive repurchase intention. Figure 1 illustrates the proposed research model and the hypothesized relationships among the constructs.

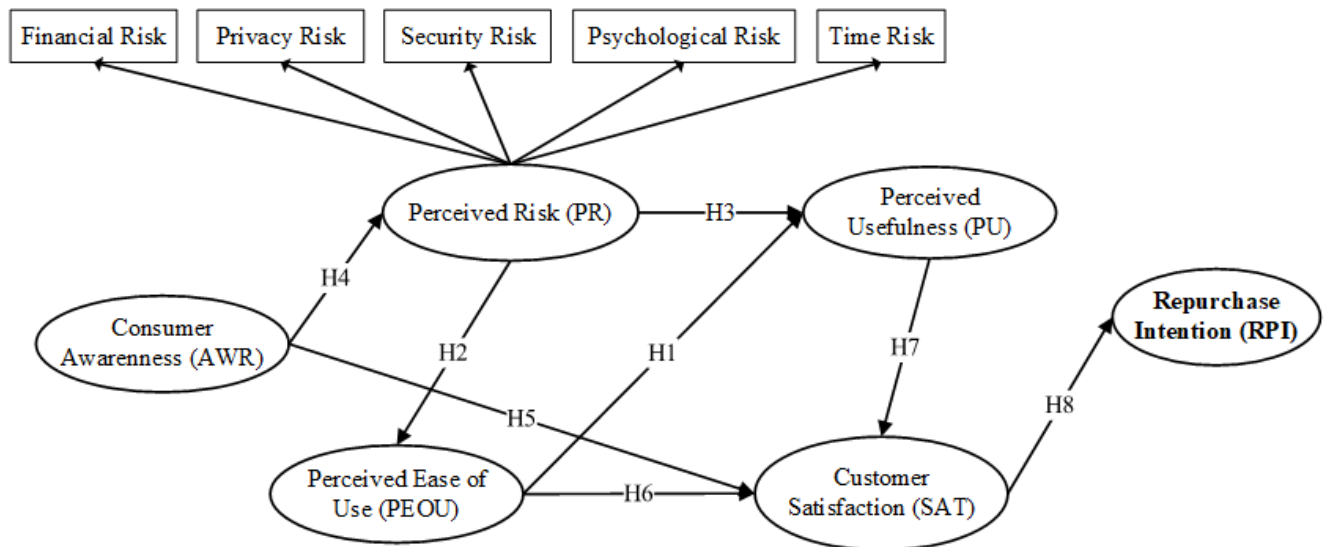


Fig. 1. Conceptual framework

3.2. Measurement Development

All constructs in this study were measured using multi-item scales adapted from well-established prior studies to ensure content validity and reliability. The measurement items were slightly modified to fit the context of post-purchase behavior on e-commerce platforms.

Perceived ease of use and perceived usefulness were measured using scales adapted from [3,4]. Perceived risk was operationalized as a second-order construct comprising multiple first-order dimensions, including financial risk, privacy risk, security risk, psychological risk, and time risk, adapted from [8,15]. Consumer awareness was measured using items adapted from [10,11], capturing consumers' knowledge of platform features, transaction processes, and potential risks. Customer satisfaction was measured using items adapted from [1,5], while repurchase intention was measured using scales adapted from [19,20]. All items were measured on a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree").

3.3. Data Collection and Sample

Data were collected through a structured online survey administered to consumers who had prior purchasing experience on major e-commerce platforms. To ensure the relevance of responses, screening questions were used to confirm that respondents had completed at least one online purchase within the past six months.

The data collection process was conducted over a six-month period, from July 2025 to December 2025. A non-probability sampling approach was employed, which is commonly used in e-commerce and consumer behavior research. During the data cleaning process, responses that were incomplete,

inconsistent, or failed the screening criteria were excluded from the analysis. After eliminating invalid observations, a total of 410 valid responses were retained for subsequent analysis.

The final sample size exceeded the minimum threshold recommended for structural equation modeling, ensuring adequate statistical power for model estimation and hypothesis testing.

3.4. Data Analysis Technique

Structural equation modeling was employed to test the proposed research model and hypotheses. SEM is particularly suitable for this study as it allows for the simultaneous estimation of multiple relationships among latent constructs and accounts for measurement error.

The data analysis followed a two-step approach. First, the measurement model was evaluated through confirmatory factor analysis to assess reliability, convergent validity, and discriminant validity of the constructs. Composite reliability and Cronbach's alpha were used to assess internal consistency reliability. Convergent validity was examined using factor loadings and average variance extracted, while discriminant validity was assessed by comparing the square root of AVE with inter-construct correlations. Second, the structural model was evaluated to test the hypothesized relationships among the constructs. Model fit was assessed using multiple goodness-of-fit indices, including the chi-square statistic, and the standardized root mean square residual (SRMR).

Second-order Construct Assessment: Perceived risk was modeled as a second-order reflective construct composed of multiple first-order risk dimensions. This approach captures the multidimensional nature of perceived risk in e-commerce contexts and aligns with prior research that emphasizes the holistic impact of risk perceptions on consumer evaluations. The validity of the second-order construct was assessed by examining the significance and magnitude of the paths from the second-order construct to its first-order dimensions, as well as the overall model fit. This hierarchical modeling approach provides a more comprehensive understanding of how perceived risk influences post-purchase evaluations.

Common Method Bias: To address potential common method bias, several procedural remedies were implemented. Respondents were assured of anonymity and confidentiality, and the questionnaire was designed to minimize item ambiguity and evaluation apprehension. In addition, statistical tests such as Harman's single-factor test were conducted to assess the presence of common method variance.

4. Research results and discussion

4.1 Research results

4.1.1. Assessment of the Measurement Model

Following the two-step approach recommended for PLS-SEM analysis, the measurement model was first evaluated in terms of internal consistency reliability, convergent validity, and discriminant validity [21,22].

Internal Consistency Reliability: Internal consistency reliability was assessed using Cronbach's alpha, composite reliability (CR), and indicator (outer) loadings. According to the literature, Cronbach's

alpha and composite reliability values should exceed 0.70 to indicate satisfactory reliability, whereas values between 0.60 and 0.70 may be acceptable in exploratory research [21,23]. Additionally, indicator loadings should be greater than 0.70, indicating that each indicator explains a substantial proportion of the variance in its corresponding construct [22]. The results show (Table 1) that all constructs demonstrate adequate internal consistency reliability. Specifically, Cronbach's Alpha values range from 0.715 (PU) to 0.852 (RPI), all exceeding the recommended minimum threshold. Similarly, Composite Reliability values range from 0.782 (PR) to 0.910 (RPI), confirming strong reliability across all constructs. Regarding indicator reliability, all outer loadings are above 0.70, ranging from 0.703 to 0.971, indicating that all measurement items load strongly on their respective latent constructs. As no indicator exhibits a loading below the acceptable cutoff, all items were retained for further analysis. Overall, these findings confirm that the measurement scales exhibit satisfactory internal consistency and indicator reliability (Table 2).

Table 1 Construct Reliability and Validity

Structure	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
AWR	0.834	0.845	0.889	0.668
PEOU	0.793	0.794	0.879	0.707
PR	0.771	0.761	0.782	0.614
PU	0.715	0.733	0.841	0.641
RPI	0.852	0.854	0.910	0.771
SAT	0.726	0.728	0.842	0.640

Convergent validity was assessed using the Average Variance Extracted (AVE). AVE values greater than 0.50 indicate that a construct explains more than half of the variance in its indicators, thereby supporting convergent validity [24,25]. As presented in Table 1, all constructs exhibited AVE values well above the recommended threshold of 0.50, ranging from 0.614 (PR) to 0.771 (RPI). These results indicate that the indicators adequately converge to measure their respective constructs. Therefore, the convergent validity of the measurement model was established.

Table 2 Outer Loadings and Outer VIF Values

Observed Variables	AWR	PEOU	PR	PU	RPI	SAT	VIF
AWR1	0.875						2.253
AWR2	0.831						1.979
AWR3	0.811						1.769
AWR4	0.748						1.555
FR1			0.971				1.072
FR2			0.753				2.360
PEOU1		0.852					1.746
PEOU2		0.849					1.824
PEOU3		0.821					1.543
PSR1			0.718				2.659

PSR2	0.732		1.675
PU1		0.703	1.235
PU2		0.875	1.761
PU3		0.813	1.611
PVR1	0.728		2.781
PVR2	0.749		2.974
RPI1		0.883	2.055
RPI2		0.883	2.215
RPI3		0.869	2.021
SAT1			0.817 2.341
SAT2			0.825 2.395
SAT3			0.757 1.141
SR1	0.788		1.232
SR2	0.772		2.353
TR1	0.706		2.345
TR2	0.741		2.357

Discriminant validity was assessed using two complementary approaches: (1) the Fornell–Larcker criterion and (2) the Heterotrait–Monotrait ratio (HTMT), as recommended in recent PLS-SEM literature [22,26].

(1) Fornell–Larcker Criterion: According to the Fornell–Larcker criterion, the square root of each construct's AVE should exceed its correlations with all other constructs [24]. As presented in Table 3, the square root of the AVE for each construct (shown on the diagonal of the correlation matrix) was greater than its corresponding inter-construct correlations. These results indicate that each construct shared more variance with its own indicators than with other constructs in the model, thereby supporting discriminant validity based on the Fornell–Larcker criterion.

Table 3 Fornell–Larcker criterion

Variables	AWR	PEOU	PR	PU	RPI	SAT
AWR	0.818					
PEOU	0.691	0.841				
PR	0.521	0.521	0.338			
PU	0.517	0.638	0.384	0.800		
RPI	0.604	0.632	0.747	0.564	0.878	
SAT	0.494	0.535	0.472	0.616	0.695	0.800

(2) Heterotrait–Monotrait Ratio (HTMT): HTMT was used as an additional criterion to assess discriminant validity. HTMT values below 0.85 (strict criterion) or 0.90 (liberal criterion) indicate satisfactory discriminant validity [26]. As shown in Table 4, all HTMT values were below the conservative threshold of 0.85, with the highest value being 0.846 (between SAT and RPI). Therefore,

the constructs demonstrated adequate discriminant validity based on the HTMT criterion. Taken together, the results from both the Fornell–Larcker criterion and the HTMT analysis provide strong evidence of discriminant validity for the measurement model.

Table 4 Heterotrait-Monotrait ratio

Variables	AWR	PEOU	PR	PU	RPI	SAT
AWR						
PEOU	0.846					
PR	0.220	0.213				
PU	0.672	0.850	0.195			
RPI	0.713	0.767	0.255	0.723		
SAT	0.596	0.659	0.214	0.846	0.836	

These results indicate that the measurement model is reliable and valid, thereby providing a solid foundation for evaluating the structural model and testing the proposed hypotheses.

4.1.2. Structural Model Assessment

Following the assessment of the measurement model, the structural model was evaluated to examine the hypothesized relationships among the constructs. Consistent with established PLS-SEM guidelines, the structural model assessment included the evaluation of collinearity, path coefficients, the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and overall model fit [21,22,27].

Collinearity Assessment: Collinearity among the predictor constructs was assessed using the variance inflation factor (VIF). VIF values below 5.0 indicate that collinearity is not a serious concern, while values below 3.3 satisfy a more conservative criterion [21,28]. As presented in Table 1, all VIF values ranged from 1.072 to 2.974, well below the recommended thresholds. These results indicate that collinearity was not a concern, suggesting that the estimated path coefficients were not adversely affected by multicollinearity. Therefore, the structural model satisfied the collinearity assumption for subsequent hypothesis testing.

The structural relationships were examined using standardized path coefficients (β) obtained through the bootstrapping procedure. As presented in Table 7, consumer awareness (AWR) had a positive effect on perceived risk (PR) ($\beta = 0.521$) and customer satisfaction (SAT) ($\beta = 0.173$), indicating its important role in shaping post-purchase evaluations. Perceived risk (PR) negatively affected perceived ease of use (PEOU) ($\beta = -0.521$), whereas its effect on perceived usefulness (PU) was not statistically significant ($\beta = 0.071$), resulting in the rejection of the corresponding hypothesis. Perceived ease of use (PEOU) positively influenced perceived usefulness (PU) ($\beta = 0.601$), supporting the core proposition of the Technology Acceptance Model [25]. In addition, perceived usefulness (PU) exerted a substantial positive effect on customer satisfaction (SAT) ($\beta = 0.441$). Customer satisfaction (SAT) emerged as the strongest predictor of repurchase intention (RPI) ($\beta = 0.695$), highlighting its

pivotal role in post-purchase behavior. Overall, the structural model largely supported the proposed theoretical framework, except for the non-significant relationship between perceived risk and perceived usefulness.

Coefficient of Determination (R^2): The explanatory power of the structural model was assessed using the coefficient of determination (R^2). R^2 values of 0.25, 0.50, and 0.75 indicate weak, moderate, and substantial explanatory power, respectively [21]. As presented in Table 5, the R^2 values were 0.271 for PR, 0.272 for PEOU, 0.411 for PU, 0.429 for SAT, and 0.482 for RPI. These results indicate that the model achieved moderate explanatory power for perceived usefulness, customer satisfaction, and repurchase intention. In particular, the R^2 value of 0.482 for repurchase intention suggests that approximately 48.2% of its variance was explained by customer satisfaction and its antecedent constructs, representing satisfactory explanatory power in consumer behavior research.

Table 5 R Square and Fit Summary

	R Square	R Square Adjusted
PEOU	0.272	0.270
PR	0.271	0.269
PU	0.411	0.408
RPI	0.482	0.481
SAT	0.429	0.424
	Saturated Model	Estimated Model
SRMR	0.152	0.184
d_ULS	8.059	11.871
d_G	1.507	1.793
Chi-Square	3123.746	3502.631
NFI	0.496	0.435

Effect sizes (f^2) were examined to assess the relative impact of each exogenous construct on endogenous variables. Following [29], f^2 values of 0.02, 0.15, and 0.35 indicate small, medium, and large effects, respectively. The results reveal that:

- AWR $\rightarrow$ PR ($f^2 = 0.372$) and PR $\rightarrow$ PEOU ($f^2 = 0.373$) exhibit large effects.
- PEOU $\rightarrow$ PU ($f^2 = 0.446$) shows a large effect, reaffirming TAM's core mechanism.
- PU $\rightarrow$ SAT ($f^2 = 0.198$) represents a medium effect.
- SAT $\rightarrow$ RPI ($f^2 = 0.932$) demonstrates an exceptionally strong effect, highlighting satisfaction as the dominant driver of repurchase intention.
- In contrast, PR $\rightarrow$ PU ($f^2 = 0.006$) and PEOU $\rightarrow$ SAT ($f^2 = 0.013$) show negligible effects, consistent with their nonsignificant path coefficients.

Predictive relevance was assessed using the blindfolding procedure. A Q^2 value greater than zero indicates that the model has predictive relevance for a particular endogenous construct [30,31]. The results show that all endogenous constructs have positive Q^2 values: $Q^2_{PEOU} = 0.185$; $Q^2_{PR} = 0.025$; $Q^2_{PU} = 0.257$; $Q^2_{SAT} = 0.258$; and $Q^2_{RPI} = 0.367$. These findings confirm that the model exhibits adequate predictive relevance, particularly for repurchase intention and satisfaction (Table 6).

Table 6 Construct Crossvalidated Redundancy

	SSO	SSE	$Q^2 (=1-SSE/SSO)$
AWR	1640.000	1640.000	
PEOU	1230.000	1002.495	0.185
PR	4100.000	3998.547	0.025
PU	1230.000	914.118	0.257
RPI	1230.000	778.747	0.367
SAT	1230.000	912.636	0.258

Model Fit: Model fit was assessed using the standardized root mean square residual (SRMR). An SRMR value below 0.08 generally indicates good model fit, whereas values below 0.10 are considered acceptable in PLS-SEM applications [21,32]. As presented in Table 5, the estimated model yielded an SRMR value of 0.084, indicating an acceptable level of model fit. Previous studies have also emphasized that global fit indices should be interpreted with caution in PLS-SEM because the method primarily focuses on prediction rather than exact model fit [21,33]. Taken together with the satisfactory explanatory power (R^2), effect sizes (f^2), and predictive relevance (Q^2), these results suggest that the proposed model is appropriate for explaining and predicting post-purchase behavior.

4.1.3. Hypothesis Testing

The proposed hypotheses were examined using the bootstrapping procedure in SmartPLS. Path coefficients (β), t-values, and p-values were used to assess the significance of the hypothesized relationships. Following established PLS-SEM reporting practices, the hypotheses are presented and interpreted according to the causal structure of the research model rather than the numerical order in which they were developed in the literature review. This approach allows for a clearer interpretation of the structural relationships among the constructs and reflects the underlying logic of the proposed post-purchase behavior model (Table 7; Table 8 and Figure 2).

Table 7 Results of direct relationship testing

Hypothesis	Path	β	t-value	p-value	Result
H1	PEOU $\rightarrow$ PU	0.601	12.505	0.000	Supported
H2	PR $\rightarrow$ PEOU	0.521	2.676	0.007	Supported

Hypothesis	Path	β	t-value	p-value	Result
H3	PR $\rightarrow$ PU	0.071	1.281	0.200	Not supported
H4	AWR $\rightarrow$ PR	0.521	2.699	0.007	Supported
H5	AWR $\rightarrow$ SAT	0.173	2.457	0.014	Supported
H6	PEOU $\rightarrow$ SAT	0.134	1.862	0.063	Not supported
H7	PU $\rightarrow$ SAT	0.441	7.713	0.000	Supported
H8	SAT $\rightarrow$ RPI	0.695	27.384	0.000	Supported

Table 8 Results of indirect relationship testing

Path	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Result
AWR $\rightarrow$ PR $\rightarrow$ PEOU	0.039	6.967	0.000	Supported
PR $\rightarrow$ PEOU $\rightarrow$ PU	0.119	2.626	0.009	Supported
AWR $\rightarrow$ PR $\rightarrow$ PEOU $\rightarrow$ PU	0.027	5.996	0.000	Supported
AWR $\rightarrow$ PR $\rightarrow$ PU	0.025	1.491	0.136	Not supported
AWR $\rightarrow$ SAT $\rightarrow$ RPI	0.050	2.398	0.017	Supported
PEOU $\rightarrow$ SAT $\rightarrow$ RPI	0.050	1.844	0.065	Not supported
PR $\rightarrow$ PEOU $\rightarrow$ SAT $\rightarrow$ RPI	0.032	1.519	0.129	Not supported
AWR $\rightarrow$ PR $\rightarrow$ PEOU $\rightarrow$ SAT $\rightarrow$ RPI	0.014	1.806	0.071	Not supported
PEOU $\rightarrow$ PU $\rightarrow$ SAT $\rightarrow$ RPI	0.026	7.046	0.000	Supported
PR $\rightarrow$ PEOU $\rightarrow$ PU $\rightarrow$ SAT $\rightarrow$ RPI	0.038	2.501	0.012	Supported
AWR $\rightarrow$ PR $\rightarrow$ PEOU $\rightarrow$ PU $\rightarrow$ SAT $\rightarrow$ RPI	0.010	4.834	0.000	Supported
PU $\rightarrow$ SAT $\rightarrow$ RPI	0.040	7.642	0.000	Supported
PR $\rightarrow$ PU $\rightarrow$ SAT $\rightarrow$ RPI	0.018	1.211	0.226	Not supported
AWR $\rightarrow$ PR $\rightarrow$ PU $\rightarrow$ SAT $\rightarrow$ RPI	0.008	1.393	0.164	Not supported
PR $\rightarrow$ PEOU $\rightarrow$ SAT	0.046	1.534	0.125	Not supported
AWR $\rightarrow$ PR $\rightarrow$ PEOU $\rightarrow$ SAT	0.020	1.832	0.067	Not supported
PEOU $\rightarrow$ PU $\rightarrow$ SAT	0.036	7.280	0.000	Supported

PR → PEOU → PU → SAT	0.055	2.526	0.012	Supported
AWR → PR → PEOU → PU → SAT	0.014	5.058	0.000	Supported
PR → PU → SAT	0.026	1.219	0.223	Not supported
AWR → PR → PU → SAT	0.012	1.405	0.160	Not supported

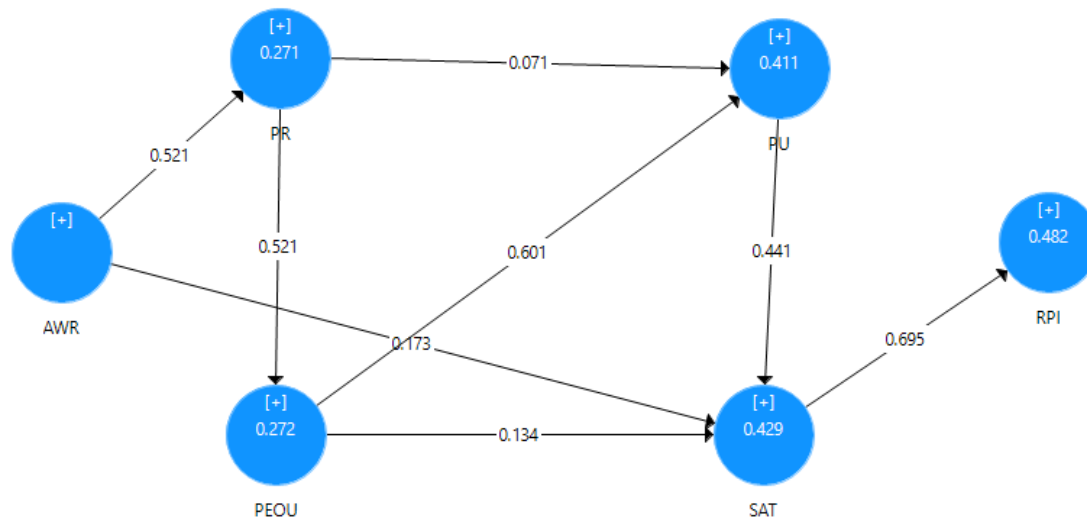


Fig 2. PLS-SEM model estimation results

4.2. Discussion

This study aims to explain post-purchase behavior in e-commerce by integrating the TAM, Perceived Risk Theory, and Expectation–Confirmation Theory into a unified analytical framework. Using PLS-SEM, the findings provide several theoretically meaningful insights into how consumer awareness, perceived risk, and technology-related perceptions jointly shape satisfaction and repurchase intention in a post-purchase context.

The Role of Technology Perceptions in Post-purchase Evaluation

Consistent with the core assumptions of the Technology Acceptance Model (TAM), perceived ease of use exerted a strong and significant positive effect on perceived usefulness. This finding confirms that system usability remains a critical antecedent of value perception even after consumers have accumulated experience with an e-commerce platform. As originally proposed by Davis [3] and further extended by Venkatesh and Davis [4], users who perceive a system as easy to learn and operate are more likely to recognize its instrumental benefits in facilitating efficient and effective transactions. The present finding is also consistent with post-adoption research, which suggests that perceived ease of use continues to influence users' evaluations through perceived usefulness during the later stages of system use [2,13].

However, the direct relationship between perceived ease of use and customer satisfaction was not supported. This finding suggests that, in the post-purchase context, ease of use functions more as a basic or hygiene factor than as a direct source of customer satisfaction. Once consumers become familiar with an e-commerce platform, usability alone is insufficient to generate satisfaction unless it

translates into tangible performance-related benefits. This interpretation is consistent with Bhattacharjee [1], who argued that post-adoption satisfaction is primarily shaped by users' evaluations of their actual usage experiences rather than by initial system characteristics. It also aligns with subsequent post-adoption studies showing that affective responses such as satisfaction are increasingly driven by outcome-based evaluations rather than interface-related perceptions during the mature stages of system use [34].

In contrast, perceived usefulness exerted a strong positive effect on customer satisfaction, highlighting its central role in post-purchase evaluations. This finding is consistent with Oliver [5] and Bhattacharjee [1], who argued that customer satisfaction is primarily determined by consumers' evaluations of perceived performance relative to their expectations. In the context of e-commerce, when consumers perceive that a platform enhances shopping efficiency, convenience, and transaction effectiveness, they are more likely to develop favorable post-purchase evaluations and higher levels of satisfaction. This finding further suggests that performance-related benefits become increasingly important after adoption, reinforcing the view that customers evaluate digital platforms based on the value they derive from actual usage rather than merely on their ease of use.

Perceived Risk as an Indirect Influence Mechanism

The findings indicate that perceived risk did not exert a significant direct effect on perceived usefulness, contrary to the relationship suggested by Featherman and Pavlou [8]. Instead, perceived risk significantly reduced perceived ease of use, which subsequently enhanced perceived usefulness through an indirect pathway. This finding suggests that risk perceptions primarily operate by increasing consumers' cognitive effort, uncertainty, and psychological burden during platform interaction rather than directly diminishing evaluations of the platform's functional benefits. In other words, consumers appear to judge the usefulness of an e-commerce platform mainly according to its actual performance and utility, whereas perceived risk primarily influences how easily they can interact with and navigate the platform. This indirect mechanism extends previous e-commerce research by demonstrating that the influence of perceived risk on post-purchase evaluations is mediated through usability perceptions rather than through direct assessments of functional value.

In the post-purchase stage, consumers may possess sufficient experiential knowledge to evaluate the usefulness of an e-commerce platform based primarily on their actual usage experiences and transaction outcomes. Consequently, perceived risk is more likely to manifest through usability-related concerns, such as anxiety, hesitation, and perceived complexity during platform interaction, rather than directly diminishing perceptions of functional value. This finding is consistent with Pavlou [35] and Kim *et al.* [9], who suggested that perceived risk primarily influences consumers' cognitive evaluations of online transactions by increasing uncertainty and interaction-related concerns. The present results further imply that the influence of perceived risk on post-purchase evaluations operates mainly through usability perceptions rather than through direct evaluations of platform usefulness.

Moreover, by modeling perceived risk as a second-order multidimensional construct, this study is consistent with the holistic conceptualization of risk in online environments proposed by Featherman

and Pavlou [8] and Stone and Grønhaug [36]. Rather than examining individual risk dimensions in isolation, the higher-order construct captures consumers' overall perceptions of uncertainty during online transactions. The findings suggest that these aggregated risk perceptions primarily influence consumers' cognitive processing and system interaction experiences, particularly by reducing perceived ease of use, rather than directly affecting evaluations of platform usefulness. This result highlights the importance of conceptualizing perceived risk as a multidimensional construct when examining post-purchase behavior in e-commerce settings.

Consumer Awareness as a Strategic Post-purchase Driver

Consumer awareness emerged as a pivotal determinant in the proposed model. The findings indicate that higher levels of consumer awareness significantly reduced perceived risk, suggesting that well-informed consumers experience lower levels of uncertainty and greater confidence when engaging in online transactions. This finding is consistent with the arguments of Akerlof [37], who emphasized that reducing information asymmetry improves decision quality by alleviating uncertainty. It also accords with previous e-commerce research demonstrating that greater transparency and consumer knowledge mitigate perceived risk in digital environments [11].

Beyond its role in reducing perceived risk, consumer awareness exerted a direct positive effect on customer satisfaction. This finding suggests that consumer awareness contributes not only to consumers' cognitive evaluations but also to their affective responses during the post-purchase stage. Consumers who possess greater knowledge of platform features, transaction procedures, and service policies are better equipped to interpret transaction outcomes, resolve minor service issues, and manage expectation–performance discrepancies, thereby enhancing their overall satisfaction. This interpretation is consistent with the findings of Luo *et al.* [38] and Kim and Lennon [39], who reported that greater consumer knowledge and transparency improve post-purchase evaluations and customer satisfaction. More importantly, the present study extends the existing literature by demonstrating that consumer awareness functions as a dual-path mechanism, simultaneously reducing perceived risk and directly enhancing customer satisfaction in e-commerce post-purchase contexts.

Satisfaction as the Central Mechanism Driving Repurchase Intention

Consistent with Oliver [40] and Bhattacharjee [1], customer satisfaction emerged as a strong predictor of repurchase intention. This finding reinforces the central role of satisfaction as the primary psychological mechanism through which post-purchase evaluations are translated into future behavioral intentions. In highly competitive e-commerce markets characterized by low switching costs and abundant alternatives, satisfied customers are more likely to continue using the platform, engage in repeat purchases, and develop long-term loyalty. These findings suggest that customer satisfaction functions as the final evaluative outcome that integrates consumers' perceptions of platform performance and subsequently shapes their future behavioral decisions.

Furthermore, the mediation analysis demonstrated that customer satisfaction served as a key mechanism through which perceived usefulness, perceived ease of use, perceived risk, and consumer awareness influenced repurchase intention. The presence of multiple significant indirect and

sequential mediation effects suggests that consumers' repurchase intentions are shaped through a progressive evaluative process rather than by isolated direct relationships. Collectively, these findings reinforce the importance of examining post-purchase behavior from an integrated process perspective, in which cognitive beliefs, risk perceptions, and customer satisfaction jointly shape repurchase intention.

Theoretical Implications

This study offers several important theoretical contributions. First, it extends TAM by demonstrating that the effects of perceived ease of use become increasingly indirect in post-purchase contexts, while perceived usefulness remains a dominant determinant of satisfaction. Second, it advances perceived risk theory by revealing that risk primarily influences post-purchase outcomes through mediated cognitive pathways rather than direct value judgments. Third, it highlights consumer awareness as a strategic construct that simultaneously reduces perceived risk and enhances satisfaction. Finally, by integrating TAM, Perceived Risk Theory, and Expectation–Confirmation Theory, this study provides a comprehensive framework that captures the sequential and dynamic nature of post-purchase behavior in e-commerce settings.

5. Contributions and managerial implications

5.1. Contributions

This study makes several important theoretical contributions to the literature on e-commerce, consumer behavior, and information systems by extending established theories into the post-purchase context.

First, this study extends the Technology Acceptance Model (TAM) beyond its traditional emphasis on technology adoption and initial usage by empirically demonstrating its applicability in the post-purchase stage of e-commerce. Whereas previous studies have primarily employed TAM to explain adoption and continuance intentions, the present findings show that perceived ease of use and perceived usefulness remain influential after purchase by shaping consumers' post-purchase evaluations, particularly through customer satisfaction. This contribution advances the theoretical scope of TAM by supporting a lifecycle perspective in which technology perceptions continue to influence consumer behavior beyond the initial adoption decision. The findings therefore respond to recent calls to examine technology acceptance across multiple stages of the customer journey, rather than limiting TAM to pre-adoption contexts, as suggested by Thong *et al.* [13] and Hsu *et al.* [2].

Second, this study advances the literature on perceived risk in e-commerce by conceptualizing perceived risk as a second-order multidimensional construct and empirically validating its indirect role in post-purchase behavior. Rather than directly influencing customer satisfaction or repurchase intention, perceived risk primarily operates by shaping consumers' technology-related evaluations, particularly perceived ease of use. The absence of a significant relationship between perceived risk and perceived usefulness further suggests that, in post-purchase contexts, consumers' evaluations are influenced more by actual interaction experiences than by abstract assessments of platform performance. This finding refines existing risk-based explanations by demonstrating that perceived risk functions primarily as an indirect antecedent of post-purchase behavior, thereby extending the

multidimensional perspective on perceived risk proposed by Featherman and Pavlou [8] and supported by Kim *et al.* [9].

Third, this study advances the post-purchase e-commerce literature by demonstrating the dual role of consumer awareness in shaping consumers' post-purchase evaluations. Beyond its established function as a mechanism for reducing perceived risk, consumer awareness also directly enhances customer satisfaction, indicating that its influence extends beyond cognitive risk reduction to affective post-purchase evaluations. This finding broadens the theoretical understanding of consumer awareness by suggesting that well-informed consumers are better equipped to evaluate transaction outcomes, manage service-related uncertainties, and develop more favorable post-purchase judgments. Accordingly, consumer awareness should be viewed not only as a cognitive antecedent that mitigates perceived risk but also as a relational resource that strengthens customers' confidence and satisfaction throughout the post-purchase process. This contribution complements the perspectives of Bettman [17] and Oliver [5], providing a more comprehensive explanation of how informed consumers develop favorable post-purchase evaluations in e-commerce environments.

Finally, by integrating TAM, perceived risk theory, and expectation–confirmation theory within a single structural model, this study offers a holistic framework for explaining repurchase intention in e-commerce settings. The findings clarify the mediating role of customer satisfaction as a key mechanism through which technology perceptions and consumer awareness translate into repurchase intention, thereby contributing to a more integrated theoretical understanding of post-purchase behavior in digital commerce environments.

5.2. Managerial implications

The findings of this study offer several actionable insights for e-commerce platform managers, online retailers, and digital service providers seeking to enhance customer satisfaction and encourage repeat purchasing.

First, the strong effect of perceived ease of use on customer satisfaction underscores the importance of continuous usability optimization even after consumers have completed a purchase. E-commerce platforms should prioritize intuitive navigation, streamlined checkout processes, and responsive system performance throughout the post-purchase journey, including order tracking, customer support, and return management. Improving post-purchase usability can significantly enhance satisfaction and foster repeat purchasing behavior.

Second, the results suggest that managing perceived risk alone is insufficient unless it is accompanied by improvements in consumers' actual usage experience. While reducing perceived risk remains important, particularly through secure payment systems and transparent policies, managers should recognize that risk reduction primarily enhances satisfaction indirectly by improving ease of use. This highlights the need for integrated risk management strategies that combine security assurance with user-friendly system design.

Third, the significant role of consumer awareness offers a critical managerial lever for enhancing post-purchase satisfaction. E-commerce platforms should invest in proactive consumer education through clear communication of platform features, transaction procedures, privacy protections, and after-

sales policies. Tools such as onboarding tutorials, FAQs, interactive guides, and transparent policy disclosures can enhance consumers' awareness, reduce uncertainty, and reinforce confidence during and after transactions.

Finally, given the strong influence of customer satisfaction on repurchase intention, managers should treat post-purchase satisfaction as a strategic performance metric rather than a mere outcome variable. Monitoring satisfaction feedback, addressing post-purchase complaints promptly, and continuously improving post-purchase service quality can help e-commerce firms build long-term customer relationships and sustain competitive advantage in increasingly saturated online markets.

Despite its contributions, this study has several limitations. First, the cross-sectional research design limits the ability to infer causal relationships among the constructs. Second, the use of self-reported survey data may introduce common method bias, although procedural remedies were applied to mitigate this concern. Future research could employ longitudinal designs or objective behavioral data to further validate the proposed relationships.

Author Contributions

Minh Tri Nguyen: Conceptualization, methodology, formal analysis, investigation, data curation, writing—original draft preparation, supervision, project administration, and corresponding author. Van Nguyen Thi Cam: Validation, resources, writing—review and editing, and visualization. Tran Thi Thanh Thanh: Investigation, data curation, software, formal analysis, and writing—review and editing. Hiep Ngo Tan: Methodology, validation, writing—review and editing, supervision, and resources. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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