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The Mediating Role of Online Tracking in the Relationship Between Delivery Timeliness and Customer Satisfaction in E-Commerce

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Abstract: This study aims to analyze the determinants of customer satisfaction in the e-commerce landscape by examining the roles of timeliness of delivery and online tracking. In a competitive market, customer satisfaction has become a crucial indicator of success, where logistics and supply chain management play a central role. This research proposes and tests a mediation model where online tracking is hypothesized to mediate the relationship between timeliness of delivery and customer satisfaction for Shopee Indonesia users. Using a quantitative approach, data were collected through a survey of 150 Shopee consumers in Indonesia and analyzed using Partial Least Squares - Structural Equation Modeling (PLS-SEM). The results confirm that all four proposed hypotheses were accepted. The findings indicate a significant positive influence of timeliness of delivery on both online tracking and customer satisfaction. Online tracking also has a strong positive effect on customer satisfaction. Crucially, the study validates that online tracking acts as a significant mediator in the relationship between timeliness of delivery and customer satisfaction. These findings imply that e-commerce platforms must prioritize both the reliability of delivery and the transparency of the tracking process to enhance overall customer satisfaction.

Keyword: Customer Satisfaction, Online Tracking, Timeliness of Delivery.

INTRODUCTION

The rapid development of e-commerce has fundamentally transformed the global business landscape, with platforms like Shopee emerging as dominant market players. In this highly competitive ecosystem, customer satisfaction has become the most crucial indicator of success(Brunner et al. 2025; Ruminda et al. 2025). Modern consumers not only prioritize product quality but also demand a seamless and reliable online shopping experience, from the ordering process to product reception. In this context, logistics and supply chain management

play a central role in shaping customer perceptions and satisfaction, making it a primary arena of competition for e-commerce companies. One of the most vital logistical factors is the timeliness of delivery. Delivery delays can trigger frustration, dissatisfaction, and ultimately, lead to customer churn. Conversely, on-time deliveries, or those arriving even earlier than anticipated, can significantly enhance customer satisfaction and loyalty. Consumer perception of delivery timeliness directly and positively influences their satisfaction with e-commerce services. Delivery reliability is one of the key predictors of customer satisfaction in the logistics sector (Brunner et al. 2025; Ruminda et al. 2025).

In addition to timeliness, logistics visibility through online tracking is also an indispensable component. This service allows consumers to monitor their order status in real-time, which includes information about the package's location, estimated arrival time, and delivery status. Online tracking is designed to reduce information asymmetry between the seller and the buyer, thereby mitigating post-purchase consumer anxiety and uncertainty. The availability of accurate and up-to-date tracking information significantly influences consumer perceptions of service quality and, ultimately, their satisfaction. The role of logistical information transparency is to build trust and enhance customer satisfaction (Bimarso et al. 2024; Sirait et al. 2023).

Although the literature has confirmed the individual influence of these two variables, the more complex relationship between timeliness of delivery and online tracking still requires further exploration. Some previous studies suggest that strong delivery performance may not be sufficient to guarantee customer satisfaction if information about the delivery process online tracking is inadequate. Conversely, transparent tracking information can manage customer expectations, even in the event of a delay, thus preventing a drastic decline in satisfaction (Veronica et al. 2025). Based on this context, this study argues that online tracking not only has a direct influence but also acts as a mediating variable that explains how the timeliness of delivery affects customer satisfaction. In other words, the effectiveness of on-time delivery is reinforced and effectively communicated to customers through the transparency provided by the online tracking system (Indriyarti et al. 2022)

Timeliness of delivery is a crucial factor in the e-commerce context that directly influences customer satisfaction (Zhu 2025). This concept is not merely defined by the speed of delivery, but rather by the service provider's ability to meet or even exceed the time-based expectations promised to the consumer. Timeliness of delivery is measured through indicators that reflect various aspects of a reliable delivery experience. These include the accuracy of time estimation, such as the ability to provide precise delivery estimates from the onset of the transaction; adherence to the schedule, which is the consistency in delivering products according to the established timeline; and proactive communication and alerts, which are the provider's efforts to actively inform on the delivery status, including providing notifications or warnings of potential schedule changes (Elektra et al. 2024; Kumar and Mishra 2024).

Timeliness of delivery is positioned as an independent variable with a significant influence. Within the research model, timeliness of delivery is hypothesized to not only directly impact customer satisfaction but also to influence the customer's perception of the utility of online tracking (Ran, Shi, and Geng 2024). The rationale is that when the delivery schedule is accurate and adhered to, the information displayed via the online tracking system becomes more relevant and trustworthy, which in turn collectively enhances overall customer satisfaction (Kumar and Mishra 2024).

Online tracking is a system that enables consumers to monitor the status and movement of their orders in real-time, from the point of dispatch to the final destination. Its primary objective is to reduce information asymmetry between the seller and the buyer, thereby mitigating the anxiety and uncertainty often experienced by consumers post-purchase (Pavithra and Velmurugan 2023). The function and importance of online tracking can be detailed through four dimensions. These include the availability of information, which is the foundational

element of the tracking system, where customers can readily access tracking information whenever they need it (Kumar and Mishra 2024). Status accuracy aims to ensure that the provided information is precise and reflects the actual location and status of the package. Inaccuracy can lead to frustration and erode customer trust, which may result in customer dissatisfaction. Information updates are evident when a system provides regular and timely updates at each stage of the delivery process.

Overall, an effective online tracking system serves as a proactive communication tool that builds transparency (Sianturi et al. 2024; Zhu 2025). This transparency is crucial for fostering trust and enhancing the perception of service quality, which ultimately has a significant impact on customer satisfaction. Accurate and real-time information reduces post-purchase uncertainty and improves the overall customer experience (Nagadeepa et al. 2024).

Customer satisfaction is the overall assessment and positive feeling that arises after a consumer compares their expectations with the actual experience received from an online shopping platform. This satisfaction stems not only from product quality but is the result of the entire customer journey, from the ordering process to product reception. Customer satisfaction is measured through four primary dimensions that reflect a comprehensive consumer evaluation (Rezende et al. 2024). Satisfaction with the product pertains to whether the received item aligns with its description, quality, and the consumer's expectations. Satisfaction with the service encompasses all non-product interactions, such as platform usability and customer service, including logistics services like delivery and tracking. Satisfaction with the overall experience constitutes a holistic evaluation of the entire transaction process, indicating the critical importance of a seamless and reliable shopping experience. Repurchase intention is considered a robust indicator of satisfaction, wherein satisfied customers are more inclined to make future purchases, which leads to customer loyalty (McKecnie, Ganguli, and Roy 2011; Ruminda et al. 2025)

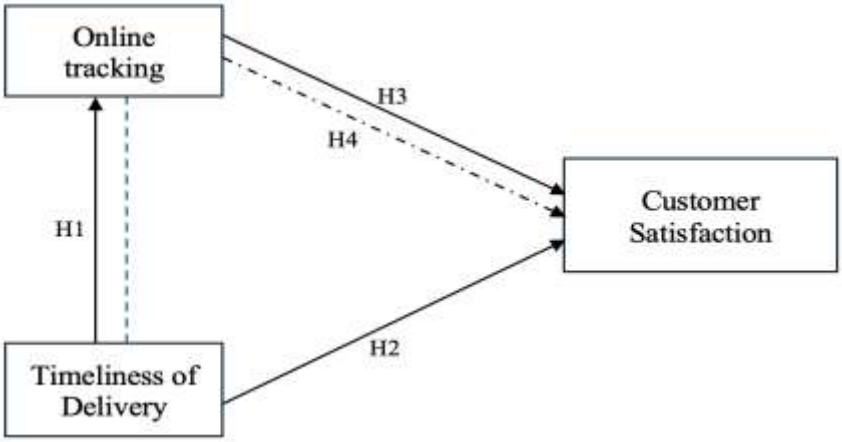
The quality of logistics services, particularly delivery reliability and timeliness, are the most significant predictors of customer satisfaction in online shopping. Modern customers expect delivery to be not only fast but also reliable. The transparency of logistics information, including the capability for real-time parcel tracking, significantly reduces customer uncertainty and increases satisfaction. When customers can monitor their orders, their perception of the overall service quality is enhanced (Lestari et al. 2025; Romy et al. 2025).

Therefore, this research aims to test a mediation model that integrates these three variables—timeliness of delivery, online tracking, and customer satisfaction—to provide a more comprehensive understanding of the factors that drive customer satisfaction in the e-commerce industry.

METHOD

This study employed a quantitative approach with a survey method. Its primary objective was to test and analyze the causal relationships among the hypothesized variables, namely the effect of timeliness of delivery, online tracking and customer satisfaction. The sample for this study consisted of 150 Shopee consumers in Indonesia. Data was collected via questionnaires distributed to the respondents (Cabañas Ramos et al. 2024). This questionnaire was designed to measure the research variables using established indicators.

The study involved three variables independent variables such as task delegation and online tracking, and a dependent variable, customer satisfaction, which was measured with four indicators.



Source: Research Results
Figure 1. 1. Research Model

The collected data was analyzed using Partial Least Squares - Structural Equation Modeling (PLS-SEM) with SmartPLS 4 software (Hair et al. 2019, 2022). The analysis was conducted in two main stages: the evaluation of the measurement model (outer model), which aimed to test the validity and reliability of the research instruments, and the evaluation of the structural model (inner model), which aimed to test the research hypotheses.

RESULTS AND DISCUSSION

The study's sample consists of 150 respondents, with a balanced gender distribution of 55 males and 95 females. All participants are aged between 18 and 30 years, classifying them within the Generation Z cohort. The primary eligibility criteria for participation were being a Shopee Indonesia customer within the last three months and residing in the Jakarta area. This demographic profile is considered crucial for the contextual interpretation of the research findings and for determining the generalizability of the results.

Descriptive and Normality Statistics Test

According to Table 1, the high mean scores indicate that respondents tended to agree with the questionnaire items presented. The standard deviation values show the presence of response variation among participants, although it is not overly extreme. All items exhibit negative skewness, which means the data tend to be concentrated on the right side of the curve. Regarding kurtosis, while most items show values approaching zero, several items (particularly CS2, CS3, and CS4) have relatively high kurtosis values. This indicates that the data distribution for these items is not entirely normal and tends to be more peaked than a standard normal distribution.

Table 1. Descriptive and Normality Statistics

Construcs	Item	Mean	Std Dev	Normality Statistic	
				Excess kurtosis	Skewness
TD	TD1	4.030	1.005	-0.223	-0.782
	TD2	3.890	1.157	-0.332	-0.766
	TD3	3.900	1.127	-0.106	-0.822
	TD4	4.240	0.907	0.308	-1.070
	TD5	4.130	0.956	0.132	-0.894
OT	OT1	3.970	1.063	0.867	-1.158
	OT2	3.850	1.024	0.434	-0.772
	OT3	3.920	0.987	-0.496	-0.535
	OT4	3.850	1.062	0.503	-0.864
CS	CS1	3.920	0.868	0.819	-0.867
	CS2	3.990	0.854	1.850	-1.055

Construcs	Item	Mean	Std Dev	Normality Statistic	
				Excess kurtosis	Skewness
	CS3	4.060	0.822	1.804	-1.099
	CS4	4.140	0.800	3.765	-1.450

Source: Questionnaire Processing Results with SmartPLS

In the context of SmartPLS 4 analysis, the normality assumption is not a major issue because PLS-SEM is a non-parametric statistical method that does not necessitate normally distributed data. Therefore, even with the presence of non-normal items, the PLS-SEM analysis can proceed without complications.

Outer loading & Contruct Reliability and Validity Test

Based on the convergent validity test results in this study, all items are valid and suitable for further analysis. Additionally, in the Average Variance Extracted test, all constructs exhibit good convergent validity (Table 2).

Table 2. Outer loading & Contruct Reliability and Validity

Construct	Item	Outer loading	Cronbach's alpha	rho_a	rho_c	AVE
TD	TD1	0.730	0.901	0.920	0.926	0.716
	TD2	0.867				
	TD3	0.903				
	TD4	0.880				
	TD5	0.841				
OT	OT1	0.756	0.878	0.883	0.917	0.736
	OT2	0.888				
	OT3	0.888				
	OT4	0.892				
CS	CS1	0.886	0.865	0.869	0.908	0.712
	CS2	0.783				
	CS3	0.857				
	CS4	0.847				

Source: Questionnaire Processing with SmartPLS

Overall, the results of the Outer Model analysis indicate that the measurement model of this study has met all the criteria for convergent validity and reliability. All questionnaire items and constructs used in this research are deemed appropriate and reliable for measuring the variables under investigation (Table 2).

Table 3. Discriminant Validity: Heterotrait-Monotrait Ratio (HTMT)

Construct	CS	OT	TD
CS			
OT	0.702		
TD	0.713	0.469	

Source: Questionnaire Processing with SmartPLS

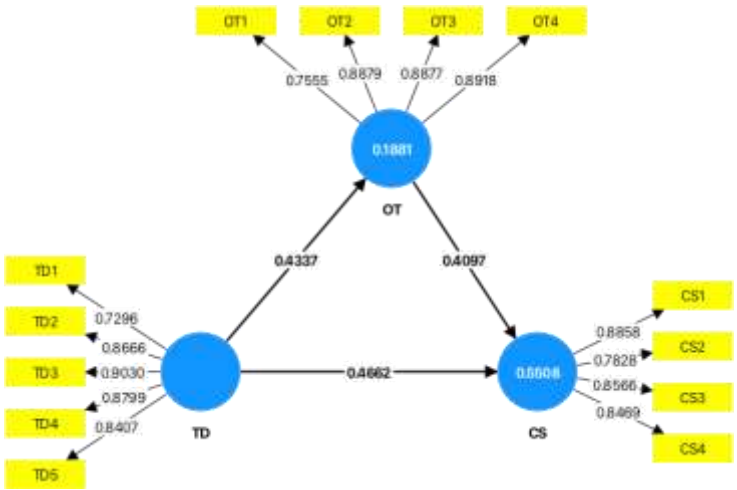
Discriminant Validity: Heterotrait-Monotrait Ratio Test

The relationship between online tracking and customer satisfaction has a Heterotrait-Monotrait Ratio (HTMT) value of 0.702. This result indicates that discriminant validity between online tracking and customer satisfaction is established, proving that these two constructs are distinct concepts with no measurement overlap. The relationship between timeliness of delivery and customer satisfaction yields an HTMT value of 0.713. This demonstrates that discriminant validity between timeliness of delivery and customer satisfaction is fulfilled, showing that the two constructs are different concepts.

Furthermore, the relationship between timeliness of delivery and online tracking has an HTMT value of 0.469. This shows that discriminant validity between these constructs is very well established. Such a low value strongly indicates that the two constructs are clearly distinct from one another. Thus, discriminant validity is achieved for all pairs of constructs in this research model. No HTMT value exceeds the suggested limits. Therefore, it can be concluded with confidence that the constructs of timeliness of delivery, online tracking, and customer satisfaction are distinct and unique variables (Table 3.).

Based on the research model (Figure 2) the variables of timeliness of delivery and online tracking collectively predict customer satisfaction. Furthermore, timeliness of delivery also serves as a predictor for online tracking. The Variance Inflation Factor (VIF) for the predictors of customer satisfaction reveals a value of 1.232 for online tracking's prediction of customer satisfaction. This value is well below the established threshold and even the ideal criterion, indicating that no significant multicollinearity issue exists between the online tracking and timeliness of delivery variables in predicting customer satisfaction. For the predictor of online tracking, the VIF value for timeliness of delivery is 1. This is because only one predictor variable (timeliness of delivery) influences online tracking in this model; therefore, this value automatically confirms the absence of any multicollinearity problem.

It can be concluded that the research model is free from multicollinearity issues. The independent variables, timeliness of delivery and online tracking, are not too strongly correlated with each other.



Source: Questionnaire Processing with SmartPLS

Figure 2. Structural Outer Model

R-square adjusted And f-square Test

The R-square value for customer satisfaction is 0.551 (Adjusted R-square: 0.542), which indicates that the independent variables in the research model (namely, timeliness of delivery and online tracking) collectively explain 55.1% of the variance in customer satisfaction. The remaining 44.9% is attributed to other factors not included in this research model. According to the criteria from Hair et al. (0.50) and Chin (0.33), this value is classified as moderate, demonstrating that the research model has good predictive power for the customer satisfaction variable.

For online tracking, the R-square value is 0.188 (Adjusted R-square: 0.180), indicating that the independent variable (timeliness of delivery) explains 18.8% of its variance. The remaining 81.2% is explained by other factors outside the model. Based on Chin's (0.19) criterion, this value is classified as weak. This suggests that although timeliness of delivery has

a significant influence, other, more potent variables affect customer perceptions of online tracking that were not included in this model.

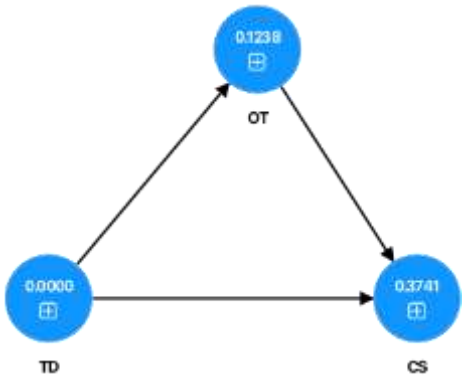
Overall, the research model has a moderately good predictive capability for the primary variable of customer satisfaction. However, the model's ability to predict online tracking is considered weak, indicating that perceptions of the online tracking feature are influenced by more factors than just the timeliness of delivery (Table 4).

Table 4. R-asquare adjusted Test

Construct	R-square	R-square adjusted	Remark
CS	0.551	0.542	Moderate
OT	0.188	0.180	Moderate

Source: Questionnaire Processing with SmartPLS

Based on the f-square results, it can be concluded that timeliness of delivery exerts the strongest influence in this model, especially in predicting customer satisfaction with a large effect size. Online tracking also has a substantive (medium to large) influence on customer satisfaction. The influence of timeliness of delivery on online tracking is also considerable, with a medium effect size.



Source: Questionnaire Processing with SmartPLS

Figure 3. Blindfolding Model

Predictive Relevance (Q2) Test

The Q^2 value for customer satisfaction is 0.374, which shows that the research model has predictive relevance for the customer satisfaction construct. This value can be considered a good or strong level of predictive relevance. The Q^2 value of 0.124 for online tracking indicates that the model also possesses predictive relevance for the online tracking construct. Its predictive ability is not as strong as that for CS, but it still demonstrates that the model is capable of predicting variation in online tracking. The Q^2 value for timeliness of delivery is 0.000, and this value should not be interpreted and can be disregarded. Timeliness of delivery is a purely independent (exogenous) variable that has no predictors. Overall, this research model (Figure 3) has good predictive relevance because the Q^2 values for both dependent constructs (customer satisfaction and online tracking) are positive.

Table 5. Hypothesis Test

Hypothesis	Path	Std. Beta	Std Error	t value	p value	Bias	Confidence interval		Remarks
							2.50%	97.50%	
H1	TD -> OT	0.434	0.114	3.792	0.000	0.005	0.185	0.638	Accepted
H2	TD -> CS	0.466	0.071	6.548	0.000	-0.003	0.308	0.589	Accepted
H3	OT -> CS	0.410	0.059	6.895	0.000	0.007	0.296	0.523	Accepted
H4	TD -> OT -> CS	0.178	0.060	2.983	0.003	0.006	0.079	0.313	Accepted

Note: p-value ≤ 0.05 dan t-value ≥ 1.96

Hypothesis Test

Analysis of the structural model (inner model) through a bootstrapping procedure indicates that all four hypotheses proposed in this study were accepted, as they met the criteria for statistical significance. This finding suggests that the proposed model for explaining the determinants of customer satisfaction at Shopee Indonesia is both valid and robust.

H1: The influence of timeliness of delivery on online tracking.

The first hypothesis (H1), which posits that timeliness of delivery has a positive and significant effect on online tracking, was accepted. The results show a positive path coefficient (Std. Beta = 0.434) and are statistically significant (t-value = 3.792; p-value = 0.000).

This finding provides a new insight that the customer's perception of the utility of the online tracking feature is influenced by the reliability of the delivery process itself. When customers perceive that the delivery schedule is accurate and adhered to, they will consider the information presented by the tracking system to be more relevant, trustworthy, and beneficial. Conversely, if deliveries are frequently delayed, the tracking feature will only become a source of frustration (Nagadeepa et al. 2024; Ruminda et al. 2025). Visibility in the delivery process, which is facilitated by online tracking, is key to satisfaction. If the delivery performance is poor, the visibility provided by online tracking will only highlight this failure, thereby reducing the perceived value of online tracking in the eyes of the customer (Qodarisman and Jaya 2025).

H2: The influence of timeliness of delivery on customer satisfaction.

The second hypothesis (H2), which states that timeliness of delivery has a positive and significant effect on customer satisfaction, was accepted. This relationship exhibits the strongest direct influence within the research model (Std. Beta = 0.466) and is highly significant (t-value = 6.548; p-value = 0.000).

This result confirms that timeliness of delivery is a fundamental pillar in creating customer satisfaction in the e-commerce industry, such as at Shopee. For modern consumers, the fulfillment of a promised delivery time is one of the most vital aspects of the online shopping experience (Pahrudin et al. 2024). This finding is highly consistent with various previous studies which state that consumer perception of delivery timeliness directly and positively influences their satisfaction. This research result also asserts that delivery reliability is one of the key predictors of customer satisfaction in the logistics sector (Brunner et al. 2025; Lestari et al. 2025; Sandra et al. 2025).

H3: The influence of online tracking on customer satisfaction.

The third hypothesis (H3), which posits that online tracking has a positive and significant effect on customer satisfaction, was accepted. This influence was also proven to be strong (Std. Beta = 0.410) and statistically significant (t-value = 6.895; p-value = 0.000).

This finding demonstrates the importance of logistics visibility and transparency for customers. By providing accurate and real-time tracking information, Shopee can reduce post-purchase anxiety, build trust, and enhance the perception of service quality. The ability for customers to independently monitor their orders provides a sense of control and certainty, which directly contributes to overall satisfaction. This result is found that the availability of accurate and up-to-date tracking information significantly influences the perception of service quality and consumer satisfaction (Astria et al. 2023; Sirait et al. 2023). The role of logistical information transparency is crucial in building trust and enhancing customer satisfaction.

H4: The mediating role of online tracking.

The fourth hypothesis (H4), which states that online tracking significantly mediates the influence of timeliness of delivery on customer satisfaction, was accepted. This indirect effect was proven to be significant (Std. Beta = 0.178; t-value = 2.983; p-value = 0.003).

This is the key finding of this research. The result demonstrates that the positive influence of timely delivery on customer satisfaction is not only direct but is also reinforced and explained through the transparency mechanism provided by online tracking. This means that customer satisfaction is shaped not just by the final outcome (the package arriving on time), but also by the process (the ability to monitor the package's journey). Online tracking serves as a "coping mechanism" that helps customers manage their expectations and experiences with the delivery process, which ultimately affects their satisfaction.

This aligns with the findings (Pahala et al. 2024; Pratiwi et al. 2023; Rezende et al. 2024)which identified online tracking as an effective way to reduce customer anxiety, inherently supporting its mediating role in managing the delivery experience.

CONCLUSION

The study validates a robust model for customer satisfaction at Shopee Indonesia, accepting all four proposed hypotheses. The findings identify timeliness of delivery as the strongest direct predictor of satisfaction, while also proving that it significantly enhances the perceived value of online tracking. Furthermore, online tracking serves a dual role: it directly boosts satisfaction through transparency and acts as a vital mediating variable, reinforcing the positive impact of timely delivery by reducing post-purchase anxiety.

For e-commerce practitioners, specifically within Shopee, this research highlights that delivery reliability is paramount. Companies must move beyond simply meeting delivery deadlines to also providing accurate, real-time tracking systems. This combination of speed and transparency is essential for building trust and mitigating customer anxiety. Consequently, investing in high-quality logistics information is a strategic necessity to improve perceived service quality and overall customer satisfaction.

That the reliability of the delivery process directly influences the perceived utility of the tracking feature. Additionally, the research contributes a comprehensive mediation model demonstrating exactly how online tracking bridges the gap between delivery timeliness and customer satisfaction. This offers a new theoretical perspective on the dynamics between logistics performance, information transparency, and customer sentiment.

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