

E-Service Quality, Delivery Timeliness, Customer Loyalty and Customer Satisfaction among J&T Service Users in Mebidangro Metropolitan Area

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Abstract. This research aims to examine the impact of e-service quality and delivery timeliness on customer loyalty, with customer satisfaction as a mediating variable. The study was conducted with J&T service users in the Mebidangro Metropolitan Area, a fast-growing logistics hub in Sumatera Island. Using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS) approach, data collected from 236 respondents and analyzed to test the relationships among the variables using SmartPLS software. The findings show that both e-service quality and delivery timeliness significantly influence customer loyalty, and this effect is mediated by customer satisfaction. Specifically, improvements in e-service quality, such as ease of use and website responsiveness, lead to higher customer satisfaction, which in turn enhances loyalty. Similarly, timely deliveries foster customer trust, increasing satisfaction and, consequently, loyalty. These results suggest that J&T should prioritize both digital platform improvements and logistical efficiencies to boost customer retention. The study confirms previous research findings on the importance of service quality and customer satisfaction in building long-term loyalty.

Keywords: customer satisfaction, customer loyalty, delivery timeliness, e-service quality, J&T

1 Introduction

The rapid growth of e-commerce has significantly influenced the logistics industry, with delivery services becoming a crucial component of customer satisfaction. As consumers increasingly for online shopping, their expectations for faster and more reliable delivery have risen. Companies like J&T have played a pivotal role in meeting these demands, but the competitive landscape is forcing them to continuously innovate. J&T has seen fluctuations in customer loyalty, with its Top Brand Index varying over the past few years [1]. While J&T improved its standing in recent years, service quality issues, particularly regarding delivery timeliness and customer service responsiveness, remain prevalent. Late deliveries and unresolved customer complaints highlight some of the challenges that could affect customer satisfaction. This raise concerns that if not addressed, these issues could erode customer loyalty over time. Thus, understanding how service quality and delivery timeliness impact customer satisfaction and loyalty is

essential for J&T's long-term success. Customer loyalty is a key metric that reflects a company's ability to retain customers and maintain a competitive edge. Loyalty goes beyond repeat purchases; it signifies a customer's emotional commitment to a brand despite potential market challenges or situational factors [2]. In the case of J&T, customer loyalty is influenced by multiple factors, including the perceived quality of electronic services (e-service quality) and the ability to deliver packages on time. Previous studies suggest that customers are more likely to remain loyal to a service provider if they consistently meet or exceed expectations [3,4]. For J&T, offering reliable services through an efficient e-service platform can enhance the user experience, resulting in higher satisfaction levels. However, inconsistencies in service delivery, such as delayed shipments, can disrupt this trust and push customers towards competitors. It is critical to explore how these service factors contribute to overall customer satisfaction, as satisfaction is often the bridge between service quality and loyalty. By doing so, J&T can better understand the dynamics that affect their customer retention rates. E-service quality shaped customer perceptions of a service, particularly in the digital age. Defined as the overall evaluation of the service experience in an online environment, e-service quality encompasses elements such as ease of use, website design, responsiveness, and assurance [5]. In the case of J&T, maintaining high e-service quality is vital, as customers interact with their services mainly through digital platforms. Customers expect seamless, efficient experience, from tracking packages to receiving updates on delivery statuses. Failure to deliver these basic digital experiences can lead to dissatisfaction, which in turn affects customer loyalty. Previous studies have demonstrated that strong e-service quality correlates with higher customer satisfaction, which subsequently fosters loyalty [6–8]. Therefore, ensuring that J&T's digital services are robust and user-friendly is critical to retaining customers. As the market grows more competitive, poor e-service quality could lead to a rapid loss of customers to competitors who offer better online experiences.

Another factor influencing customer satisfaction and loyalty is delivery timeliness. Customers today value not only the quality of the goods they purchase but also how quickly and accurately they receive them [9]. In J&T's case, late deliveries have been a common complaint, which has raised concerns about the company's ability to meet customer expectations. When packages arrive later than promised, it affects the overall customer experience, making it difficult for J&T to retain loyalty. Delivery timeliness is not just about punctuality; it is also about communication and reliability. If a company can assure customers that their packages will arrive on time, customers are more likely to trust the brand and remain loyal. Studies suggest that timely deliveries significantly impact on customer satisfaction, which mediates the relationship between service quality and loyalty [10,11]. For J&T to enhance customer retention, focusing on improving delivery timeliness is as critical as enhancing the e-service quality, as both are interconnected in shaping the overall customer experience. This study aims to test several hypotheses:

H1: Delivery timeliness has a significant positive effect on customer loyalty.

H2: E-service quality has a significant positive effect on customer loyalty.

H3: Delivery timeliness has a significant positive effect on customer satisfaction.

H4: E-service quality has a significant positive effect on customer satisfaction.

H5: Customer satisfaction has a significant positive effect on customer loyalty.

H6: Customer satisfaction mediates the relationship between e-service quality and customer loyalty.

H7: Customer satisfaction mediates the relationship between delivery timeliness and customer loyalty.

2 Method

Mebidangro Metropolitan area encompassing Medan, Binjai, Deli Serdang, and Karo is a rapidly developing urban region in North Sumatra, Indonesia. It serves as a strategic economic hub, with a growing population and significant demand for logistics and delivery services, making it an ideal location to study customer behavior in the delivery sector. This area was chosen due to its dynamic market and the increasing use of e-commerce, providing a relevant setting to evaluate the impact of service quality and delivery timeliness on customer satisfaction and loyalty.

This study adopts a quantitative research method using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS) approach to examine the relationships between e-service quality, delivery timeliness, customer satisfaction, and customer loyalty. SEM was chosen for its ability to test complex models involving multiple dependent and independent variables simultaneously, making it suitable for evaluating the mediating effect of customer satisfaction follows the rules by [12]. The design allows for the investigation of direct and indirect effects among the variables to provide a comprehensive understanding of how e-service quality and delivery timeliness influence customer loyalty. The sample was selected using a non-probability sampling method, specifically convenience sampling, due to the accessibility of respondents and their relevance to the study [13]. The questionnaire included items measuring the four key variables and assessed them using a 5-point Likert scale, where respondents indicated their level of agreement by [14] with various statements related to their experience with J&T services. Table 1 presents the operationalization of variables, including their descriptions, indicators, and sources used in this study.

Table 1. Operationalization of Variables

Variable Name	Indicators	Source
E-Service Quality	Ease of use, Website design, Responsiveness, Assurance	[15]
Delivery Timeliness	On-time delivery, Accuracy of tracking information, Meeting promised delivery dates	[16]
Customer Satisfaction	Service meets expectations, Overall satisfaction, Willingness to recommend	[17]
Customer Loyalty	Repeat purchases, Word of mouth, Resistance to competitor offers	[18]

The index for each variable for descriptive statistics analysis calculated by determining the weighted average of the responses across different categories, which involved multiplying the response percentages by corresponding weights assigned to each response level [19]. The overall index value was then derived from this weighted average, allowing for a comprehensive representation of the variable's performance. Based on the index values obtained, each variable was classified into categories such

as "High," "Medium," or "Low," [20]. In inferential statistics analysis calculated by [12], employing the outer model metrics such as Average Variance Extracted (AVE) and Factor Loadings to assess construct validity. The criteria for acceptance include an AVE value greater than 0.50 and Factor Loadings exceeding 0.70, which indicate that the constructs explain a significant portion of the variance in their indicators. Additionally, Cronbach's Alpha and Composite Reliability for measuring internal consistency, with thresholds of Cronbach's Alpha above 0.70 and Composite Reliability exceeding 0.70 considered acceptable. For the inner model analysis, bootstrapping with 5,000 subsamples is performed to test the significance of the path coefficients, alongside the calculation of f^2 and R^2 values. The significance level is set at 0.05, with criteria including $p < 0.05$ for path coefficients, f^2 values above 0.35 indicating a large effect size, thus confirming the strength of the relationships among variables.

3 RESULTS

3.1 Respondent Characteristics

According to [12], the minimum sample size for social research to achieve a path coefficient value between 0.11 and 0.22 at a significance level of 5% is 155 respondents. Therefore, this study can proceed as the total number of respondents, which is 236 respondents, meets the requirements for reliable distribution and data analysis. Table 2 detail the respondent profile based on these demographic factors.

Table 2. Respondent Profile

Category	Description	n	%
Gender	Male	119	50.42
	Female	117	49.58
Age	Below 25 Years	70	29.66
	26-35 Years	55	23.31
	36-45 Years	69	29.24
	46-55 Years	29	12.29
	Above 55 Years	13	5.51
Occupation	Student/Scholar	49	20.76
	Military/Police	4	1.69
	Civil Servant	17	7.20
	Entrepreneur	122	51.69
	Private Employee	35	14.83
	Other	9	3.81
Income	Below IDR 1 million	29	12.29
	IDR 1-2 million	55	23.31
	IDR 2-3 million	91	38.56
	Above IDR 3 million	61	25.85

The demographic data indicates a nearly even distribution between male and female respondents. A larger portion of the respondents fall within the younger age groups, highlighting that the services resonate well with a more youthful customer. In terms of occupation, most participants are entrepreneurs, reflecting the entrepreneurial spirit in

the region and their reliance on efficient delivery services. Lastly, the income distribution reveals a diverse economic background among respondents, with many indicating middle-income levels, suggesting varying needs and expectations from the service provider.

3.2 Descriptives Statistics

Table 3 presents the index and category for each variable analyzed in the study.

Table 3. Index and Category Each Variable

Variable	Index	Category
E-Service Quality	71.91%	Medium
Delivery Timeliness	72.93%	Medium
Customer Loyalty	74.17%	High
Customer Satisfaction	75.64%	High

The results indicate that both e-service quality and delivery timeliness fall within the medium category, suggesting that there is room for improvement in these areas. Conversely, customer loyalty and customer satisfaction are classified as high, indicating that the respondents generally perceive these aspects positively. This distribution highlights the effectiveness of J&T's services in fostering customer loyalty and satisfaction, while also pointing out the need to enhance e-service quality and delivery timeliness for better overall performance. Addressing these medium-rate areas can lead to improved customer experience and stronger long-term relationships with users.

3.3 Inferential Statistics

Table 4 presents the results of the outer model analysis through metrics named Average Variance Extracted (AVE) values and outer loadings for assessing the validity and reliability of the constructs used in the study.

Table 4. Outer Model

Variable	AVE Analysis	Outer Range	Loadings	Cronbach's Alpha	Composite Reliability
E-Service Quality	0.626	0.746 - 0.847		0.933	0.934
Customer Satisfaction	0.576	0.731 - 0.833		0.815	0.820
Delivery Timeliness	0.639	0.647 - 0.777		0.919	0.921
Customer Loyalty	0.503	0.722 - 0.823		0.858	0.861

The analysis indicates that all variables have AVE values above the acceptable threshold of 0.50, confirming their validity. The outer loadings for each item associated with the constructs also exceed the recommended value of 0.70, further supporting the robustness of the measurement model. These findings demonstrate that the constructs adequately represent the underlying latent variables and contribute to the overall

model's reliability. Additionally, the Cronbach's Alpha and Composite Reliability values for each variable are above 0.70, indicating strong internal consistency. Overall, these results affirm that the outer model meets the necessary criteria for validity and reliability, establishing a solid foundation for subsequent analyses.

Table 5 presents the results of the inner model analysis, which was conducted using bootstrapping to test the proposed hypotheses. Each hypothesis is evaluated based on the original sample values, t-statistics, and p-values, indicating their significance. Additionally, the analysis includes the f-square values to assess the effect sizes of the relationships among the constructs.

The inner model analysis confirms that all hypotheses are accepted, indicating significant relationships among the constructs. Delivery timeliness and e-service quality both positively influence customer satisfaction and loyalty, reinforcing the importance of these factors in the customer experience. The f-square values indicate that the effects of delivery timeliness and e-service quality on customer loyalty are small, while the effect of customer satisfaction on loyalty is moderate. This suggests that while improvements in delivery and e-service quality are beneficial, enhancing customer satisfaction has a more substantial impact on fostering loyalty. The mediation effects of customer satisfaction in the relationships between delivery timeliness and loyalty, as well as e-service quality and loyalty, emphasize the critical role of satisfaction in driving long-term customer engagement.

Table 5. Inner Model

Hypothesis	Original Sample	T Statistics	P Values	Hypothesis Status	f-square	Effect Level
H1: Delivery Timeliness positively affects customer loyalty.	0.153	1.727	0.042	Accepted	0.015	Small
H2: E-Service Quality positively affects customer loyalty.	0.370	4.187	0.000	Accepted	0.088	Small
H3: Delivery Timeliness positively affects customer satisfaction.	0.418	3.959	0.000	Accepted	0.073	Small
H4: E-Service Quality positively affects customer satisfaction.	0.293	2.825	0.002	Accepted	0.036	Small
H5: Customer satisfaction positively affects customer loyalty.	0.382	6.695	0.000	Accepted	0.233	Moderate

H6:	Delivery Timeliness positively affects customer loyalty mediated by customer satisfaction.	0.160	3.205	0.001	Accepted	-	-
H7:	E-Service Quality positively affects customer loyalty mediated by customer satisfaction.	0.112	2.665	0.004	Accepted	-	-

4 Discussion

4.1 Impact of Delivery Timeliness

The analysis confirms that delivery timeliness positively affects customer loyalty (H1) and customer satisfaction (H3), with both hypotheses accepted. This finding aligns with consumer behavior theory, which posits that timely service delivery enhances customer expectations and satisfaction, fostering loyalty in the process. The results resonate with previous research indicating that reliability in delivery is crucial for maintaining customer trust and satisfaction in the logistics sector. For J&T in the Mebidangro Metropolitan Area, the emphasis on timely deliveries can significantly improve customer experiences, reinforcing their competitive edge in a rapidly evolving market. The acceptance of these hypotheses underscores the need for J&T to prioritize logistical efficiency, ensuring that deliveries are made within the promised timeframes. As timely deliveries lead to positive customer evaluations, they can directly translate into increased repeat purchases and recommendations. Furthermore, the consistent delivery of packages can mitigate dissatisfaction caused by delays, thereby enhancing overall customer loyalty. By effectively managing delivery timelines, J&T can cultivate a loyal customer base that views their services as reliable and dependable.

4.2 Impact of E-Service Quality

The findings indicate that e-service quality significantly impacts customer loyalty (H2) and customer satisfaction (H4), leading to the acceptance of both hypotheses. This reinforces the notion that high-quality online services are critical in today's digital marketplace, where customers expect seamless and user-friendly experiences. The results confirm earlier studies that emphasize the importance of e-service quality in enhancing customer satisfaction and loyalty, particularly in logistics and e-commerce sectors. For J&T in the Mebidangro area, improving aspects such as website functionality, responsiveness, and ease of navigation can substantially enhance the customer experience. As consumers increasingly rely on digital platforms, ensuring a high level of e-service quality becomes essential for retaining customers in a competitive landscape. The acceptance of these hypotheses highlights the interdependence between online service quality and customer perceptions, illustrating

how a strong digital presence can drive customer engagement. By prioritizing enhancements in e-service quality, J&T can better meet customer expectations and foster lasting loyalty. Ultimately, investing in digital services not only enhances customer satisfaction but also contributes to the overall success of J&T in the logistics market.

4.3 Role of Customer Satisfaction

The analysis supports the significant role of customer satisfaction in mediating the relationships between service quality and loyalty, as evidenced by the acceptance of hypotheses H5, H6, and H7. Customer satisfaction is vital in consumer behavior, acting as a bridge between positive service experiences and sustained loyalty. The findings echo previous research that highlights customer satisfaction as a critical determinant of loyalty in service industries, reinforcing its importance in the logistics sector. For J&T in the Mebidangro Metropolitan Area, understanding that satisfied customers are more likely to exhibit loyalty can inform strategies for enhancing service delivery and digital experiences. The acceptance of these hypotheses emphasizes that improvements in delivery timeliness and e-service quality will significantly enhance customer satisfaction, ultimately leading to increased loyalty. By focusing on customer satisfaction, J&T can create a feedback loop where satisfied customers generate positive word-of-mouth, attracting new clientele. Additionally, this reinforces the notion that maintaining high levels of customer satisfaction is essential for long-term business success. In summary, J&T can leverage customer satisfaction as a strategic asset to build stronger customer relationships and drive growth in a competitive market.

5 Conclusion

This study confirms that both e-service quality and delivery timeliness have a significant impact on customer loyalty, with customer satisfaction acting as a key mediating factor. The results demonstrate that improvements in e-service quality—such as website functionality, ease of use, and responsiveness—directly increase customer satisfaction, which in turn enhances customer loyalty. Similarly, delivery timeliness plays a critical role in shaping customer satisfaction, as timely deliveries reassure customers about the reliability of the service. The findings reinforce the importance of maintaining both high-quality online services and reliable delivery processes to foster long-term customer loyalty. This mediation effect of customer satisfaction highlights that addressing both digital and logistical aspects of service quality is essential for enhancing the overall customer experience.

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