

# CHATBOT QUALITY ALONE DOES NOT CREATE LOYALTY: SATISFACTION AND TRUST AS TRANSMISSION MECHANISMS

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## Abstract

Chatbots have become a primary customer-service channel on Indonesian e-commerce platforms, yet evidence on how chatbot service quality is converted into customer loyalty remains limited. This study examines the effect of the service quality of Tokopedia's chatbot on e-loyalty and tests customer satisfaction and e-customer trust as parallel mediating mechanisms. A quantitative explanatory cross-sectional design was applied through an online survey of Tokopedia users; 297 responses were collected and 235 passed the screening criterion of prior chatbot use. All constructs were specified as reflective higher-order constructs measured by 23 items on a seven-point semantic differential scale, and the data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) with SmartPLS 4. Service quality has a positive and significant effect on customer satisfaction, e-customer trust and e-loyalty, and both mediators significantly increase e-loyalty. Both indirect paths are significant, and together they account for roughly three quarters of the total effect of service quality on e-loyalty, whereas the direct effect is significant but weak in magnitude. The model explains 65.0% of the variance in e-loyalty. The findings indicate that chatbot quality builds loyalty mainly by producing satisfying and trustworthy interactions rather than directly.

**Keywords:** Chatbot; Customer Satisfaction; E-customer Trust; E-loyalty; Service Quality

## INTRODUCTION

Digital technology has reshaped how Indonesian consumers search for, evaluate and purchase products, and e-commerce has become the default channel for a large share of everyday transactions (Wibowo, 2023; Sustanto et al., 2024). Internet penetration in Indonesia has reached 221 million people, or about 79.5% of the population, and the value of e-commerce transactions recorded by Bank Indonesia reached IDR 453.75 trillion during 2023. The number of e-commerce users was projected to grow to 189.6 million in 2024, with Tokopedia, Shopee and Lazada consistently identified as the platforms most used by Indonesian consumers. In a market of this size, competitive advantage is increasingly determined by a platform's ability to meet consumer expectations through technology rather than by assortment or price alone.

One of the clearest expressions of this shift is the migration of customer service to conversational artificial intelligence. Chatbots in Indonesia have been involved in approximately 1.6 billion consumer interactions, of which 71% concern customer service. Tokopedia has developed an AI-based assistant, "Tanya", which handles around 55% of incoming customer questions with a monthly engagement rate above 65%. Because the chatbot is frequently the only point of contact a consumer has with the platform when a problem arises, the quality of that interaction carries a disproportionate weight in shaping the overall service experience (Ainna Khansa & Sutabri, 2024).

Customer loyalty has long been treated as a key indicator of firm performance, but in online settings it takes the specific form of e-loyalty, which is driven far more by the quality of the digital experience than by face-to-face relationships (Erwin et al., 2024; Soeharso et al., 2023). Prior research has identified a wide range of antecedents of e-loyalty, including perceived value, brand image, trust, commitment, product quality, digital marketing, price and social-media promotion (Büyükdag, 2021; Trisno & Berlianto, 2023; Suhendry, 2023). The evidence is nonetheless fragmented: some studies position service quality and satisfaction as the dominant predictors, while others find that consumer trust in the platform matters more (Sultan Afryan Novendra, 2024), which suggests that the mechanism linking service quality to loyalty is not yet well specified.

A bibliometric mapping of loyalty publications indexed in Google Scholar, performed with VOSviewer, shows that although loyalty has been studied extensively, the joint integration of service quality, customer satisfaction and e-customer trust within an e-loyalty model remains comparatively rare, and that research attention has only recently shifted toward the digital form of loyalty. More importantly, studies that examine service quality as an antecedent of loyalty generally treat service quality at the platform level and do not isolate AI-mediated service encounters. Studies that do establish satisfaction and trust as mediators between service quality and loyalty (Alnaim *et al.*, 2022; Hidayah & Suryadi, n.d.; Rintasari & Farida, n.d.) were conducted on general e-commerce services rather than on chatbot interactions. The research gap addressed here is therefore the absence of an integrative model in which chatbot service quality, customer satisfaction and e-customer trust are examined simultaneously as determinants of e-loyalty.

Drawing on the SERVQUAL framework (Parasuraman *et al.*, 1985) and Expectation Disconfirmation Theory (Oliver, 2010), this study positions chatbot service quality as the exogenous construct and customer satisfaction and e-customer trust as parallel mediators of e-loyalty among Tokopedia users. The study contributes in three ways. First, it relocates the service-quality–loyalty chain from the platform level to the AI service encounter, where service is delivered without human intermediation. Second, it estimates the two mediating routes simultaneously, which allows their relative weight to be compared rather than assumed. Third, it provides platform managers with evidence on where investment in chatbot capability yields the largest return in loyalty.

## LITERATURE REVIEW

### A. Theoretical Foundation

The SERVQUAL model, developed by Parasuraman, Zeithaml and Berry (1985), conceptualises service quality as the gap between the service a customer expects and the service the customer perceives, and identifies tangibles, reliability, responsiveness, assurance and empathy as its constituent dimensions. In an AI-mediated encounter the tangible and empathic dimensions lose much of their original meaning, because there is no physical facility and no human agent whose attentiveness can be evaluated. This study therefore retains the three dimensions that transfer directly to a text-based assistant: reliability, understood as the accuracy of the information supplied and the ability to resolve the user's problem; responsiveness, understood as the speed of reply and the willingness to assist; and assurance, understood as the courtesy and clarity of the communication.

Expectation Disconfirmation Theory (Oliver, 2010) explains how those perceptions are converted into satisfaction. Consumers compare the performance they experience with the expectation they held beforehand; performance that meets or exceeds expectation produces satisfaction, while performance below expectation produces dissatisfaction. Following Fornell (1992), satisfaction is captured here through overall satisfaction and confirmation of expectations. Oliver further describes loyalty as a sequence of phases — cognitive, affective, conative and action — in which belief about a provider becomes liking, then intention, then repeated behaviour. This study operationalises e-loyalty through its cognitive, affective and action phases, that is, through belief in the chatbot's efficiency and accuracy, enjoyment of the interaction, and actual continued and recommended use.

### B. Service Quality and E-loyalty

Service quality has consistently been reported as a determinant of loyalty in digital retailing, on the argument that an interaction which is fast, accurate and easy to complete lowers the cost of staying with a provider (Yang *et al.*, 2024; Hananto & Indrawan, 2023). In the chatbot context this argument has been extended by evidence that high-quality automated service improves user experience and contributes to electronic brand loyalty (Shahzad *et al.*, 2024), and that useful interactions with a chatbot influence the decision to remain with the provider (Huang & Gürsoy, 2024). Accordingly:

**H1.** Chatbot service quality has a positive and significant effect on e-loyalty.

### C. Service Quality, Customer Satisfaction and E-loyalty

Within the disconfirmation logic, service quality is the performance input against which expectations are compared, which makes satisfaction its most immediate consequence. Evidence from chatbot settings indicates that system quality, information quality and service quality jointly determine user satisfaction (Kian & Lu, 2024), and that satisfaction rises further when the purpose of the interaction and the use of personal information are communicated transparently (Rajaobelina *et al.*, 2021). Satisfaction, in turn, is the affective state that sustains repeated use: e-satisfaction has been shown to mediate the relationship between e-service quality and e-loyalty in marketplace settings (Cahyanti *et al.*, 2022; Hidayah & Suryadi, n.d.). Therefore:

**H2.** Chatbot service quality has a positive and significant effect on customer satisfaction.

**H4.** Customer satisfaction has a positive and significant effect on e-loyalty.

#### D. Service Quality, E-customer Trust and E-loyalty

E-customer trust is the consumer's belief in the integrity, ability and benevolence of an online system, and it becomes decisive precisely where face-to-face verification is unavailable (Alnaim et al., 2022; Rintasari & Farida, n.d.). Consistent and credible chatbot performance signals that the platform can be relied upon, and users who trust a chatbot service report stronger continued-use intentions (Nguyen et al., 2021); perceived service quality has likewise been shown to shape the level of trust users place in automated agents (Chagas et al., 2023). Trust then reduces perceived risk and converts into loyalty, as demonstrated in e-commerce settings by Rizan et al. (2020) and Muharam et al. (2021). Hence:

**H3.** Chatbot service quality has a positive and significant effect on e-customer trust.

**H5.** E-customer trust has a positive and significant effect on e-loyalty.

#### E. The Mediating Role of Satisfaction and Trust

If service quality operates on loyalty mainly by shaping how customers feel about and how far they rely on the platform, then satisfaction and trust should carry a substantial part of its effect rather than merely accompany it. Alnaim et al. (2022) demonstrate that e-satisfaction and e-trust jointly mediate the effect of e-service quality on e-loyalty, and comparable mediating effects have been reported for satisfaction in technology-enabled service experiences (Naby, 2024; Suhartanto et al., 2018) and for trust in digital service delivery (Alkrajji & Ameen, 2021). Because these mediators have not previously been estimated together in an AI service encounter, the following hypotheses are advanced:

**H6.** Customer satisfaction mediates the effect of chatbot service quality on e-loyalty.

**H7.** E-customer trust mediates the effect of chatbot service quality on e-loyalty.

#### F. Conceptual Framework

The conceptual model derived from the hypotheses is presented in Image 1. Chatbot service quality (X) is positioned as the exogenous construct, customer satisfaction (M1) and e-customer trust (M2) as parallel mediators, and e-loyalty (Y) as the endogenous outcome. The specification permits the direct and the two indirect routes to be estimated simultaneously, so that their relative contributions can be compared.

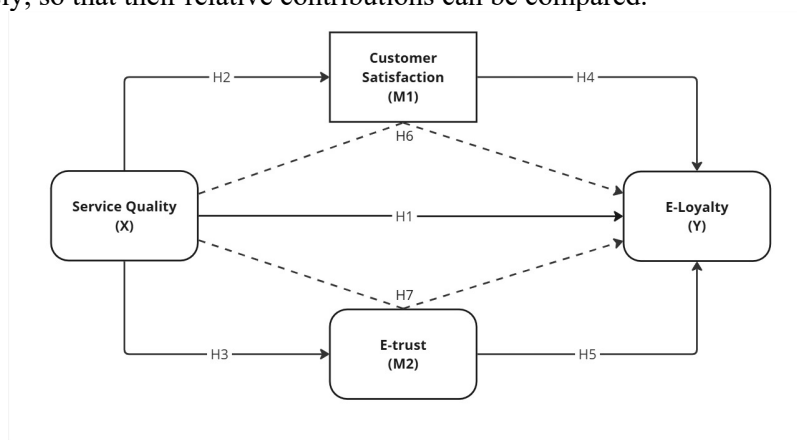


Image 1: Conceptual Framework

### METHOD

#### A. Research Design

This study applies a quantitative explanatory cross-sectional survey design to test the hypothesised relationships among chatbot service quality, customer satisfaction, e-customer trust and e-loyalty. An explanatory design is appropriate because the objective is to test theory-derived causal propositions through the statistical examination of measurable constructs rather than to describe the distribution of a single variable (Sekaran & Bougie, 2016; Sugiyono, 2013).

#### B. Sample and Data Collection

The population comprises users of the Tokopedia marketplace, the exact size of which cannot be determined because the number of visitors fluctuates daily. Non-probability sampling was applied, combining purposive and voluntary sampling, with a single screening criterion: the respondent must have previously used Tokopedia's chatbot ("Tanya"). Because the population size is unknown, the minimum sample was determined by multiplying the number of indicators by ten, yielding a minimum of 230 respondents ( $23 \times 10$ ). Data were collected through an online Google

Form questionnaire distributed via WhatsApp, TikTok, Facebook, X and Telegram between February and May 2025. A total of 297 responses were received, of which 235 (79.1%) passed the screening question and were retained for analysis, exceeding the minimum requirement.

## C. Measurement

All four constructs were specified as reflective higher-order constructs, each composed of reflective lower-order dimensions. Service quality was measured through reliability (information accuracy, problem-solving ability), responsiveness (response speed, willingness to help) and assurance (friendliness and politeness, clarity of communication), for a total of six items. Customer satisfaction was measured through overall satisfaction (positive experience, willingness to use again) and confirmation of expectations (exceeding expectations, service performance), for four items. E-customer trust was measured through integrity (information honesty, data security assurance), ability (effectiveness of guidance, functional effectiveness) and benevolence (personalised interactions, customer-centred focus), for six items. E-loyalty was measured through cognitive (perception of chatbot efficiency, trust in information accuracy), affective (satisfaction with the chatbot, enjoyment of use) and action (repurchase intention, intention to recommend, frequency of use) dimensions, for seven items. All 23 items were rated on a seven-point semantic differential scale.

## D. Data Analysis Technique

Hypotheses were tested using Partial Least Squares Structural Equation Modelling (PLS-SEM) with SmartPLS 4. PLS-SEM was selected because it accommodates complex models containing higher-order constructs and mediating variables, performs well with moderate sample sizes and imposes no multivariate normality assumption (Hair, 2022; Ali *et al.*, 2018). Higher-order constructs were estimated using the two-stage disjoint approach, in which the lower-order dimensions are validated first and their latent variable scores then serve as indicators of the higher-order constructs (Cole *et al.*, 2016). The measurement model was assessed through indicator loadings, average variance extracted ( $AVE \geq 0.50$ ), internal consistency reliability (Cronbach's alpha,  $\rho_A$  and composite reliability  $\geq 0.70$ ) and discriminant validity using the Fornell–Larcker criterion (Adda *et al.*, 2021; Dzin & Lay, 2021). The structural model was evaluated through the coefficient of determination ( $R^2$ ), effect size ( $f^2$ ), predictive relevance ( $Q^2$ ) and standardised path coefficients, with significance obtained by bootstrapping and mediation assessed through specific indirect effects (Sharma *et al.*, 2018).

## RESULTS AND DISCUSSION

### A. Respondent Profile

Of the 235 valid respondents, 74.5% were female and 25.5% male. The sample was young: 53.6% were aged 17–24 years and 33.6% aged 25–35, with 11.9% above 35 and 0.9% below 17. Respondents were drawn from 25 provinces. The largest contributions came from West Java (16.6%), Central Sulawesi (14.9%), DKI Jakarta (14.0%), East Java (10.6%), Central Java (9.4%) and the Special Region of Yogyakarta (6.0%), indicating participation from outside Java alongside the expected concentration in the most digitally penetrated provinces. By occupation, university students formed the largest group (46.8%), followed by private-sector employees (22.6%), civil servants (7.2%), entrepreneurs (6.4%) and teachers (6.0%). The profile is consistent with the demographic segment that uses digital self-service channels most intensively.

### B. Measurement Model

The first stage of the measurement assessment evaluated how well the indicators represent their respective lower-order dimensions. As shown in Table 1, indicator loadings range from 0.679 to 0.865, and AVE values for all dimensions exceed the 0.50 threshold. One indicator of the action dimension loads at 0.679, marginally below the conventional 0.70 benchmark; following Chin (1998, in Yamin, 2023), loadings of 0.60 and above may be retained where the item contributes theoretically, and the indicator was therefore preserved.

**Table 1.** Convergent Validity of Lower-Order Constructs

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| Item ← Dimension                   | Indicator                   | Loading | AVE   |
|------------------------------------|-----------------------------|---------|-------|
| RL1 ← Reliability                  | Information Accuracy        | 0.853   | 0.684 |
| RL2 ← Reliability                  | Problem Solving Ability     | 0.860   |       |
| RS1 ← Responsiveness               | Response Speed              | 0.789   | 0.577 |
| RS2 ← Responsiveness               | Willingness to Help         | 0.837   |       |
| AS1 ← Assurance                    | Friendliness and Politeness | 0.750   | 0.627 |
| AS2 ← Assurance                    | Clarity of Communication    | 0.865   |       |
| OS1 ← Overall Satisfaction         | Positive Experience         | 0.836   | 0.682 |
| OS2 ← Overall Satisfaction         | Willingness to Use Again    | 0.751   |       |
| CE1 ← Confirmation of Expectations | Exceeding Expectations      | 0.830   | 0.692 |
| CE2 ← Confirmation of Expectations | Service Performance         | 0.856   |       |
| IN1 ← Integrity                    | Information Honesty         | 0.841   | 0.670 |
| IN2 ← Integrity                    | Data Security Assurance     | 0.865   |       |
| AB1 ← Ability                      | Effectiveness of Guidance   | 0.851   | 0.734 |
| AB2 ← Ability                      | Functional Effectiveness    | 0.830   |       |
| BN1 ← Benevolence                  | Personalised Interactions   | 0.834   | 0.720 |
| BN2 ← Benevolence                  | Customer-Centred Focus      | 0.842   |       |
| CG1 ← Cognitive                    | Perception of Efficiency    | 0.794   | 0.736 |
| CG2 ← Cognitive                    | Trust in Information        | 0.804   |       |
| AF1 ← Affective                    | Satisfaction with Chatbot   | 0.847   | 0.723 |
| AF2 ← Affective                    | Enjoyment of Use            | 0.836   |       |
| AC1 ← Action                       | Repurchase Intention        | 0.818   | 0.628 |
| AC2 ← Action                       | Intention to Recommend      | 0.679   |       |
| AC3 ← Action                       | Frequency of Use            | 0.832   |       |

Source: SmartPLS 4 output (2026)

The second stage evaluated the relationship between the lower-order dimensions and the higher-order constructs. Table 2 reports loadings between 0.678 and 0.879 and AVE values between 0.630 and 0.770. The integrity dimension loads at 0.678, again slightly below 0.70 but within the range considered acceptable, and was retained on the same grounds.

**Table 2.** Convergent Validity of Higher-Order Constructs

| Construct                  | Dimension                    | Loading |
|----------------------------|------------------------------|---------|
| Service Quality (X)        | Reliability                  | 0.810   |
|                            | Responsiveness               | 0.796   |
|                            | Assurance                    | 0.775   |
| Customer Satisfaction (M1) | Overall Satisfaction         | 0.875   |
|                            | Confirmation of Expectations | 0.879   |
| E-customer Trust (M2)      | Integrity                    | 0.678   |
|                            | Ability                      | 0.872   |
|                            | Benevolence                  | 0.831   |
| E-loyalty (Y)              | Cognitive                    | 0.858   |
|                            | Affective                    | 0.866   |
|                            | Action                       | 0.868   |

Source: SmartPLS 4 output (2026)

**Table 3.** Construct Reliability and Convergent Validity

| Construct                  | CA    | rho_A | CR    | AVE   |
|----------------------------|-------|-------|-------|-------|
| Service Quality (X)        | 0.707 | 0.708 | 0.836 | 0.630 |
| Customer Satisfaction (M1) | 0.701 | 0.701 | 0.870 | 0.770 |
| E-customer Trust (M2)      | 0.713 | 0.746 | 0.838 | 0.636 |
| E-loyalty (Y)              | 0.831 | 0.832 | 0.899 | 0.747 |

Notes: CA = Cronbach's Alpha; CR = Composite Reliability; AVE = Average Variance Extracted. Source: SmartPLS 4 output (2026)

All constructs exceed the 0.70 threshold for Cronbach's alpha, rho\_A and composite reliability, and all AVE values exceed 0.50, confirming internal consistency reliability and convergent validity at the construct level. Discriminant validity was assessed with the Fornell–Larcker criterion, reported in Table 4. The square root of each construct's AVE, shown on the diagonal, exceeds every corresponding inter-construct correlation, which satisfies the criterion.

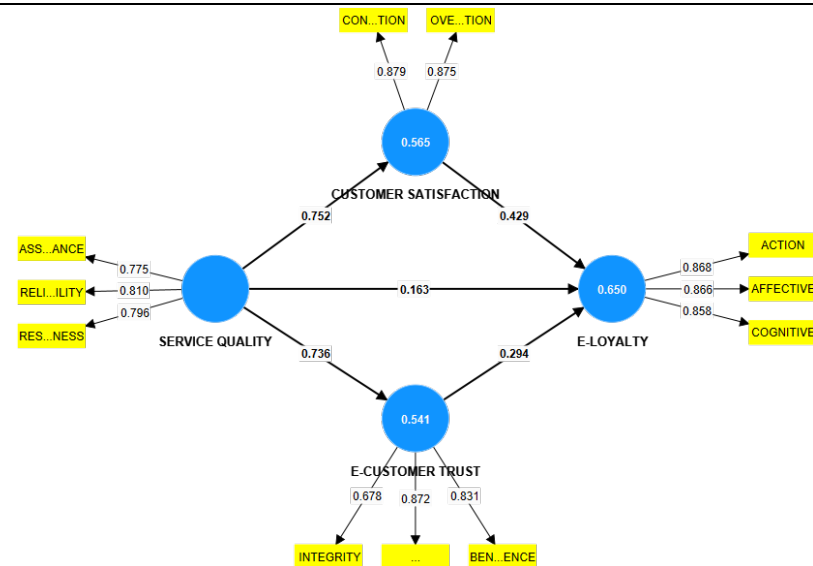
**Table 4.** Discriminant Validity (Fornell–Larcker Criterion)

| Construct                  | M1           | M2           | Y            | X            |
|----------------------------|--------------|--------------|--------------|--------------|
| Customer Satisfaction (M1) | <b>0.877</b> |              |              |              |
| E-customer Trust (M2)      | 0.706        | <b>0.798</b> |              |              |
| E-loyalty (Y)              | 0.759        | 0.716        | <b>0.864</b> |              |
| Service Quality (X)        | 0.752        | 0.736        | 0.701        | <b>0.794</b> |

Source: SmartPLS 4 output (2026)

### C. Structural Model

Following confirmation of measurement model adequacy, the structural model was estimated; the result with standardised path coefficients is shown in Image 2. As reported in Table 5, the model explains 56.5% of the variance in customer satisfaction, 54.1% in e-customer trust and 65.0% in e-loyalty, which indicates moderate explanatory power for the two mediators and substantial explanatory power for the outcome. Q<sup>2</sup> values of 0.430, 0.338 and 0.476 are all above zero and confirm the predictive relevance of the model.



**Image 2:** Estimated Structural Model with Standardised Path Coefficients  
Source: SmartPLS 4 output (2026)

**Table 5.** Coefficient of Determination ( $R^2$ ) and Predictive Relevance ( $Q^2$ )

| Endogenous Construct       | $R^2$ | $R^2$ adjusted | $Q^2$ |
|----------------------------|-------|----------------|-------|
| Customer Satisfaction (M1) | 0.565 | 0.564          | 0.430 |
| E-customer Trust (M2)      | 0.541 | 0.539          | 0.338 |
| E-loyalty (Y)              | 0.650 | 0.646          | 0.476 |

Source: SmartPLS 4 output (2026)

#### D. Hypothesis Testing

Table 6 reports the standardised path coefficients, bootstrapped t-statistics, p-values and effect sizes for the five direct relationships. All five paths are positive and statistically significant at the 95% confidence level ( $t > 1.96$ ;  $p < 0.05$ ), supporting H1, H2, H3, H4 and H5. Service quality is by far the strongest predictor of customer satisfaction ( $\beta = 0.752$ ;  $f^2 = 1.301$ ) and e-customer trust ( $\beta = 0.736$ ;  $f^2 = 1.179$ ), both of which represent large effect sizes. Satisfaction exerts a medium effect on e-loyalty ( $\beta = 0.429$ ;  $f^2 = 0.202$ ) and trust a small-to-medium effect ( $\beta = 0.294$ ;  $f^2 = 0.100$ ). The direct path from service quality to e-loyalty is significant but substantively weak ( $\beta = 0.163$ ;  $f^2 = 0.027$ ), which is the first indication that the relationship is predominantly indirect.

**Table 6.** Direct Effects and Effect Sizes

| Hyp. | Path               | Coef. | t-Stat | p-Value  | $f^2$ |
|------|--------------------|-------|--------|----------|-------|
| H1   | $X \rightarrow Y$  | 0.163 | 2.242  | 0.025*   | 0.027 |
| H2   | $X \rightarrow M1$ | 0.752 | 27.095 | 0.000*** | 1.301 |
| H3   | $X \rightarrow M2$ | 0.736 | 23.099 | 0.000*** | 1.179 |
| H4   | $M1 \rightarrow Y$ | 0.429 | 5.600  | 0.000*** | 0.202 |
| H5   | $M2 \rightarrow Y$ | 0.294 | 4.276  | 0.000*** | 0.100 |

Notes: X = Service Quality; M1 = Customer Satisfaction; M2 = E-customer Trust; Y = E-loyalty. \*  $p < 0.05$ ; \*\*\*  $p < 0.001$ . Source: SmartPLS 4 output (2026)

#### E. Mediation Analysis

The mediation hypotheses were tested through specific indirect effects, reported in Table 7. Both indirect paths are positive and significant: service quality influences e-loyalty through customer satisfaction ( $\beta = 0.323$ ;  $t = 5.390$ ;  $p < 0.001$ ) and through e-customer trust ( $\beta = 0.216$ ;  $t = 4.321$ ;  $p < 0.001$ ), supporting H6 and H7. Because the direct effect of service quality on e-loyalty also remains significant, both constructs act as partial mediators. The total effect of service quality on e-loyalty is 0.702, of which customer satisfaction transmits approximately 46%, e-customer trust approximately 31% and the direct route only 23%. Roughly three quarters of the influence of chatbot service quality on loyalty therefore travels through the two relational mechanisms rather than operating on loyalty directly.

Table 7. Specific Indirect Effects (Mediation)

| Hyp. | Indirect Path                    | Coef. | t-Stat | p-Value  |
|------|----------------------------------|-------|--------|----------|
| H6   | $X \rightarrow M1 \rightarrow Y$ | 0.323 | 5.390  | 0.000*** |
| H7   | $X \rightarrow M2 \rightarrow Y$ | 0.216 | 4.321  | 0.000*** |

Notes: \*\*\*  $p < 0.001$ . Source: SmartPLS 4 output (2026)

## F. Discussion

The empirical evidence supports all seven hypotheses, but the pattern of effect sizes is more informative than the pattern of significance. The first and most consequential finding is the asymmetry between the direct and the indirect routes. Chatbot service quality explains more than half of the variance in both customer satisfaction and e-customer trust, with effect sizes above 1.0 in each case, yet its direct contribution to e-loyalty is negligible in magnitude ( $f^2 = 0.027$ ) even though it is statistically significant at the conventional threshold. Read together with the mediation results, this indicates that an efficient chatbot does not by itself make users loyal; it makes them satisfied and confident, and it is those states that sustain continued use and recommendation. This qualifies studies that report a direct service-quality–loyalty link in e-commerce (Hananto & Indrawan, 2023; Yang et al., 2024) by showing that, once satisfaction and trust are modelled explicitly, the residual direct effect largely disappears.

The second finding concerns the relative weight of the two mediators. Customer satisfaction transmits a larger share of the total effect than e-customer trust (0.323 versus 0.216) and exerts the stronger effect on loyalty ( $\beta = 0.429$  versus 0.294). This ordering is consistent with Expectation Disconfirmation Theory: the chatbot is used for discrete, problem-driven episodes in which the user has a concrete expectation about resolution, so the evaluative comparison that produces satisfaction occurs immediately, whereas trust is a slower-accumulating belief about the platform as a whole. The result aligns with Cahyanti et al. (2022) and Naby (2024), who identify satisfaction as the dominant mechanism linking technological service experience to loyalty, while confirming that trust nonetheless makes an independent contribution (Alnaim et al., 2022; Alkraiiji & Ameen, 2021).

The third finding emerges from the measurement model rather than the structural model. Within e-customer trust, integrity — the honesty of the information provided and the assurance that personal data are protected — records the weakest loading on its construct (0.678), noticeably below ability (0.872) and benevolence (0.831). Users evidently judge Tokopedia's chatbot competent and attentive more readily than they judge it transparent about data handling. Because trust is the second-largest conduit to loyalty, this is where the marginal return on improvement is likely to be highest, and it is consistent with Rajaobelina et al. (2021), who find that clarity about the purpose of personal-data use raises satisfaction with chatbot interactions.

For practice, these results imply that investment in chatbot capability should be evaluated by its effect on satisfaction and trust rather than by loyalty metrics directly, since the latter respond only through the former. Priority should be given to response accuracy and resolution capability, which load most strongly on service quality, and to explicit communication about data security, which is currently the weakest component of trust. Expanding the chatbot's capacity to handle complex or non-standard cases — returns, disputes, technical queries — addresses both mechanisms at once, because unresolved complex cases simultaneously disconfirm expectations and undermine perceived reliability.

## CONCLUSION

This study examined whether customer satisfaction and e-customer trust mediate the effect of chatbot service quality on e-loyalty among Tokopedia users. Using PLS-SEM on data from 235 respondents, it confirms that chatbot service quality exerts positive and significant effects on customer satisfaction, e-customer trust and e-loyalty, that both mediators significantly increase e-loyalty, and that both partially mediate the service-quality–loyalty relationship. The model explains 65.0% of the variance in e-loyalty. The substantive contribution lies in the distribution of the effect rather than in its significance: approximately three quarters of the influence of chatbot quality on loyalty is transmitted through satisfaction and trust, and the direct route is significant but weak. Chatbot quality thus functions as an antecedent of relational states rather than as a direct determinant of loyal behaviour, and satisfaction is the stronger of the two conduits.

Several limitations bound these conclusions. The study covers a single platform and a single chatbot, so generalisation to other marketplaces or to voice-based assistants requires replication. The cross-sectional design permits no inference about how satisfaction and trust develop over repeated encounters, which is a particular constraint for trust, a construct theorised to accumulate over time. Sampling was non-probability and voluntary, and the resulting sample is concentrated among young, female and student respondents, so the estimates should not be read as population parameters. Service quality was restricted to the three SERVQUAL dimensions that transfer to a

text-based agent, leaving open whether an AI-specific dimension such as conversational competence would add explanatory power, and e-loyalty omitted Oliver's conative phase. Future research could address these constraints through longitudinal or experimental designs, through cross-platform comparison, and through qualitative work on how users form trust judgements when no human agent is present.

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## CHATBOT QUALITY ALONE DOES NOT CREATE LOYALTY: SATISFACTION AND TRUST AS TRANSMISSION MECHANISMS

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