E-Recovery Service Quality and E-Loyalty in Indonesian Online Travel Agents

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ABSTRACT

Indonesia's travel industry has undergone rapid digital transformation, with online travel agents emerging as key platforms due to increasing internet penetration, improved digital infrastructure, and rising consumer demand for fast and convenient travel services. This shift has intensified competition, making service quality and effective recovery mechanisms critical for maintaining customer loyalty. This study aims to empirically analyze the effect of e-recovery service quality on e-loyalty, mediated by e-service recovery satisfaction and e-trust among online travel agent customers in Indonesia. Using a descriptive quantitative approach, the study employed SEM-PLS with SmartPLS 3.0 and SPSS 23, involving 150 purposively sampled respondents. The results reveal that e-recovery service quality positively affects e-loyalty, e-service recovery satisfaction, and e-trust. Additionally, e-service recovery satisfaction positively influences e-trust, and e-trust positively impacts e-loyalty. However, e-service recovery satisfaction does not directly affect e-loyalty. In terms of mediation, e-trust partially mediates the relationship between e-recovery service quality and e-loyalty, while e-service recovery satisfaction does not mediate this relationship. Managerially, the study suggests that online travel agent managers should improve compensation policies, such as providing vouchers or points, and enhance service recovery features to ensure quick, user-friendly, and informative problem resolution.

Keywords*: Digital Service Recovery, E-Service Quality, E-Service Recovery Satisfaction, E-Trust, Customer Loyalty, Online Travel.*

ABSTRAK

Industri pariwisata di Indonesia telah mengalami transformasi digital yang pesat, dengan agen perjalanan daring muncul sebagai platform kunci akibat meningkatnya penetrasi internet, infrastruktur digital yang lebih baik, dan meningkatnya permintaan konsumen akan layanan perjalanan yang cepat dan praktis. Perubahan ini memperketat persaingan, sehingga kualitas layanan dan mekanisme pemulihan yang efektif menjadi penting untuk mempertahankan loyalitas pelanggan. Penelitian ini bertujuan untuk menganalisis secara empiris pengaruh kualitas layanan pemulihan elektronik (e-recovery service quality) terhadap loyalitas elektronik (e-loyalty), yang dimediasi oleh kepuasan pemulihan layanan elektronik (e-service recovery satisfaction) dan

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kepercayaan elektronik (e-trust) pada pelanggan OTA di Indonesia. Menggunakan pendekatan kuantitatif deskriptif, penelitian ini menerapkan SEM-PLS dengan SmartPLS 3.0 dan SPSS 23, melibatkan 150 responden yang dipilih secara purposive. Hasil penelitian menunjukkan bahwa kualitas layanan pemulihan elektronik berpengaruh positif terhadap e-loyalty, e-service recovery satisfaction, dan e-trust. Selain itu, e-service recovery satisfaction berpengaruh positif terhadap e-trust, dan e-trust berpengaruh positif terhadap e-loyalty. Namun, e-service recovery satisfaction tidak berpengaruh langsung terhadap e-loyalty. Dalam hal mediasi, e-trust memediasi sebagian hubungan antara e-recovery service quality dan e-loyalty, sedangkan e-service recovery satisfaction tidak memediasi hubungan tersebut. Secara manajerial, penelitian ini menyarankan agar manajer OTA meningkatkan kebijakan kompensasi, seperti pemberian voucher atau poin, serta memperkuat fitur pemulihan layanan untuk memastikan penyelesaian masalah yang cepat, ramah pengguna, dan informatif.

***Kata kunci**: Pemulihan Layanan Digital, Kualitas Layanan Elektronik, Kepuasan Pemulihan Layanan Elektronik, Kepercayaan Elektronik, Loyalitas Pelanggan, Perjalanan Daring*

INTRODUCTION

Over the past 13 years, Indonesia's tourism industry especially travel agencies has undergone major transformation driven by rapid technological development and rising internet penetration. Data from the Indonesian Internet Service Provider Association show consistent annual growth of internet users from 2012 to 2024, with increases averaging around 10% between 2014 and 2020, except for slower growth in 2012 and 2016. This expansion is supported by improved digital infrastructure, particularly in Eastern Indonesia, greater digital literacy, and broader ICT access. Survey by Indonesian Internet Service Provider, Java represents the largest share of users (56.4%), followed by Sumatra (22.1%), Sulawesi (7%), Kalimantan (6.3%), and other regions including Maluku, Papua, and Bali–Nusa Tenggara (8.2%) (Arif, 2022).

The growing digital population and continuous e-commerce innovation have strengthened Indonesia's position as one of the world's fastest-growing digital economies. In 2018, the country generated an internet economy valued at USD 27 billion, derived from transactions across online marketplaces, media, ride-hailing, and online travel agents (Rachbini et al., 2024). In parallel, the 4.0 industrial revolution has further accelerated internet access and digital adoption, encouraging businesses to shift toward online operations. These changes have reshaped customer expectations, especially regarding speed, convenience, and efficiency in using travel-related services.

This environment has driven the evolution of Indonesia's travel agent industry. While the market was dominated by conventional travel agents, Online Travel Agents (OTAs) began emerging around 2012. OTAs form e-commerce, conducted digitally through the internet, mobile applications, browsers, or the web (Laudon & Traver, 2021). They function as service touchpoints via the World Wide Web and serve as new distribution channels for suppliers. As digital-based platforms, OTAs conduct all transactions, booking, purchasing, payments, information delivery, and service recovery, entirely online (Clemons et al., 1998). Initially focused on selling airline tickets and accommodations, many now offer train tickets, travel packages, and various on-trip services. They also provide search tools, price comparisons, customer reviews, travel tips, fare alerts, and detailed maps, features less common in conventional travel agencies (Turban et al., 2018).

The OTA sector's expansion has been accompanied by intensifying competition. Approximately 81% of domestic tourists use OTAs for trip planning, and 86.61% prefer them over airline apps. Before the Covid-19 pandemic, the OTA market grew rapidly, with 52 companies operating in 2018 (Rosyidi, 2019). Similarweb data by Frontier Group for September–November 2022 show fluctuating performance among major brands: Traveloka's visits increased by 9.91% and Tiket.com's by 4.85%, while Trivago, Pegipegi, Agoda, Wego, and Nusatrip experienced declines.

Competitive dynamics are also reflected in the Popular Brand Index (PBI) from 2017 to 2024. Traveloka has maintained the top position for eight consecutive years, despite declines in 2018–2019. Trivago and Agoda entered the top five in 2018 and have shown continued improvement. Tiket.com has remained consistently in the top five for five years, while Pegipegi has sustained its position despite fluctuations. Wego and Nusatrip dropped from the top five after 2017. Industry perspectives support this trend: Daniel Tumiwa of idea in 2017 emphasized intensifying competition due to the increasing number of OTAs, while Hu and Chuang (2012) highlighted the role of low switching costs and minimal entry barriers in heightening rivalry, reducing margins, and complicating efforts to maintain customer loyalty. These conditions underscore the need for OTAs to deliver strong value and effective service recovery to retain users in an informed and competitive digital marketplace.

Despite extensive studies on e-commerce and online travel behavior, limited research simultaneously examines how e-service recovery quality influences e-loyalty through both e-recovery satisfaction and e-trust. This creates a research gap in understanding the combined mediating roles of satisfaction and trust within the OTA service recovery context. This study contributes by identifying two key mediation mechanisms: e-service recovery satisfaction and e-trust, in linking e-recovery service quality to e-loyalty. It extends the service recovery paradox theory and the trust–loyalty framework into the digital OTA environment. The study aims to examine the influence of e-service recovery quality on e-loyalty, mediated by e-recovery satisfaction and e-trust, and moderated by age and travel frequency. Findings indicate that customer loyalty is shaped more strongly by usage intensity than by age, suggesting that repeated interactions play a greater role in building digital loyalty than demographic differences.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

The Effect of E-Recovery Service Quality

E-recovery service quality denotes the effectiveness of digital complaint-handling mechanisms, responsiveness, compensation, contact accessibility, speed, and recovery process quality, that online vendors provide after electronic service failures (Komunda & Osarenkhoe, 2012; Fuentes-Blasco et al., 2010). High e-recovery quality reduces perceived injustice (distributive, procedural, interactional) and aligns with Expectation-Confirmation Theory (ECT), such that timely, fair, and transparent recovery restores or even exceeds customer expectations (Parasuraman et al., 2021). Empirical evidence consistently links superior e-recovery quality to greater customer satisfaction with the recovery experience: studies in e-commerce and digital services find that fast responses, clear resolutions, and fair compensation raise e-service recovery satisfaction (Mashaqi et al., 2020; Anwar et al., 2023 Arifin et al., 2023).

Beyond satisfaction, e-recovery quality fosters e-trust because effective recovery signals reliability, integrity, and benevolence core trust antecedents in digital settings (Rohwiyati et al., 2024; Ellitan & Suhartatik, 2023). When platforms demonstrate competence and fairness during recovery, users update beliefs about platform credibility, increasing willingness to transact online again. Consequently, e-recovery quality influences e-loyalty both directly and indirectly: direct effects arise from perceived competence and commitment that encourage repeat use, while indirect effects run through enhanced satisfaction and trust, which are well-documented drivers of repurchase intentions and positive word-of-mouth (Indrianti, 2022; Dhaniswara et al., 2023; Arifin et al., 2023).

H1: E-recovery service quality has a significant effect on e-loyalty.
H2: E-recovery service quality has a significant effect on e-service recovery satisfaction.
H3: E-recovery service quality has a significant effect on e-trust.

The Effect of E-Service Recovery Satisfaction and E-Trust

E-service recovery satisfaction reflects users' cognitive and emotional evaluations of how well an online platform resolves service failures, including clarity of resolution,

fairness of compensation, effectiveness of the handling process, and professionalism of staff or automated systems (Mathew et al., 2020; Yuliantini et al., 2025). According to Expectation Confirmation Theory (ECT) and the Service Recovery Paradox, when recovery efforts meet or exceed expectations, customers experience elevated satisfaction, which can restore or even strengthen their relationship with the service provider. Empirical evidence shows that well-executed recovery procedures enhance trust, because customers perceive the seller as reliable, honest, and committed to resolving issues transparently (Ellitan & Suhartatik, 2023; Karaca & Baran, 2023). This positions recovery satisfaction as an important psychological antecedent of e-trust.

Moreover, e-service recovery satisfaction is frequently identified as a direct predictor of e-loyalty. Satisfied customers are more likely to revisit digital platforms, demonstrate favourable attitudes, engage in positive word-of-mouth, and maintain long-term behavioural commitment (Mathew et al., 2020; Mashaqi et al., 2020; Ozuem et al., 2024). These mechanisms illustrate why satisfaction functions not only as an emotional outcome but also as a driver of loyalty formation.

E-trust itself plays a critical role in online environments where uncertainty and perceived risk are high. Trust determines whether customers are willing to rely on digital vendors, share personal information, and make repeat transactions. Studies consistently confirm that higher trust leads to stronger e-loyalty, as users feel secure and confident in continuing engagement (Wilis & Nurwulandari, 2020; Lova, 2021; Alnaim et al., 2022).

H4: E-service recovery satisfaction has a significant effect on e-trust.
H5: E-service recovery satisfaction has a significant effect of e-loyalty.
H6: E-trust has a significant effect on e-loyalty.

The Moderating Effect of Age and Visit Frequency

Age is widely recognized as a demographic factor that may shape how users perceive and respond to digital service recovery, trust formation, and loyalty outcomes. Younger users tend to possess higher digital literacy, stronger familiarity with technology, and greater openness toward digital-based interactions, which can amplify their responsiveness to online recovery efforts (Wilis & Nurwulandari, 2020; Indrianti, 2022). In contrast, older users may rely more heavily on perceived security, clarity of processes, and consistency in service recovery due to higher risk sensitivity. Although some studies report that recovery quality influences relationship outcomes regardless of age, others show that age moderates the strength of these relationships by altering expectations and evaluation patterns (Tseng, 2021; Ellitan & Suhartatik, 2023).

Visit frequency represents behavioral engagement and reflects the degree of exposure users have to a platform's services and recovery processes. Frequent users possess richer service experiences, stronger cognitive evaluations, and more established emotional bonds with a platform (Indrianti, 2022). Research highlights that repeated interactions raise expectations for service consistency and fairness while simultaneously increasing sensitivity to both service failures and successful recoveries (Kusuma & Tseng, 2019). High-frequency users also exhibit deeper trust formation due to accumulated positive interactions, which can translate into higher loyalty (Wilis & Nurwulandari, 2020; Ellitan & Suhartatik, 2023). Therefore, visit frequency may moderate how recovery quality, satisfaction, and trust drive e-loyalty, as frequent users react more strongly positively or negatively to digital service performance.

H7: Age moderated the influence of e-recovery service quality on e-loyalty.
H8: Age moderated the influence of e-service recovery satisfaction on e-loyalty.
H9: Age moderated the influence of e-trust on e-loyalty.
H10: Visit frequency moderated influence of e-recovery service quality on e-loyalty.
H11: Visit frequency moderated the influence of e-service recovery satisfaction on e-loyalty.
H12: Visit frequency moderated the influence of e-trust on e-loyalty.

The Mediation effect E-Service Recovery Satisfaction and E-Trust

E-service recovery satisfaction operates as a key emotional–cognitive evaluation that emerges after customers assess how effectively a platform responds to service failures. Grounded in Expectation Confirmation Theory (ECT), satisfaction arises when customers perceive that recovery efforts meet or exceed their expectations, particularly in terms of fairness, clarity, timeliness, and empathy. When recovery actions are viewed as satisfactory, customers are more likely to maintain a positive relationship with the platform, show willingness to continue using the service, and develop stronger loyalty intentions (Mathew et al., 2020; Mashaqi et al., 2020). Multiple studies confirm that satisfaction acts as a mediator that links recovery quality to loyalty by transforming service responses into positive emotional outcomes that drive attachment and repeat behavior (Oliver, 1980; Indrianti, 2022; Dhaniswara et al., 2023).

E-trust serves as another important mediator, functioning as a relational mechanism that encourages users to remain committed despite previous service failures. Trust develops when customers recognize integrity, consistency, transparency, and reliability in a platform's recovery efforts. Effective recovery enhances credibility and reduces perceived risk, leading customers to believe that the platform can prevent or resolve issues in the future (Ellitan & Suhartatik, 2023; Karaca & Baran, 2023). Prior research demonstrates that trust mediates the influence of recovery quality on loyalty by converting positive perceptions of the recovery process into deeper confidence and long-term commitment (Indrianti, 2022).

H13: E-service recovery satisfaction mediated the influence of e-recovery service quality on e-loyalty.
H14: E-trust mediated the influence of e-recovery service quality on e-loyalty.

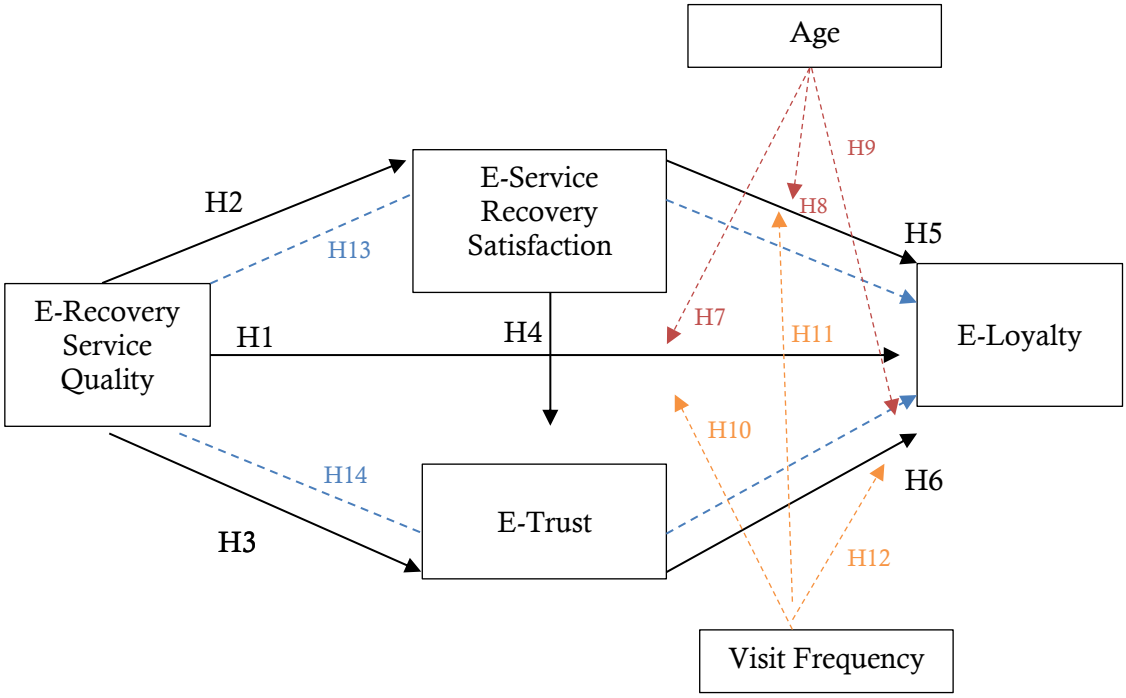

Figure 1. Research Framework

Based on Figrure 1, the research framework examines how E-Recovery Service Quality influences customers' E-Loyalty through the mediating roles of E-Service Recovery Satisfaction and E-Trust, while also considering age and travel frequency as moderating factors. It integrates the service recovery paradox and trust–loyalty theories,

highlighting how effective digital service recovery and repeated customer interactions drive long-term loyalty in the OTA context.

RESEARCH METHODS

This research employed a quantitative methodology, relying on primary data to address the research questions. The primary data was collected directly from respondents using questionnaires with responses measured on a five-point Likert scale. The data were analyzed using SEM-PLS (Structural Equation Modeling–Partial Least Squares). As a causal study, this research aims to evaluate the cause-and-effect relationships between two or more variables through hypothesis testing (Hair et al., 2021). This study builds upon the framework established by Mathew et al. (2020).

In this study, the researcher added the dimension of service recovery, with indicators of speed and process in the variable of e-recovery service quality. This was adjusted to the business context being studied, namely online travel agents. The unit of analysis in this study was individuals, namely online travel agent customers who had made at least one purchase from one of the top seven brands in Indonesia in 2021, namely Traveloka, Ticket.com, Trivago, Agoda, Pegi-pegi, Wego, and Nusa Trip, with criteria specified in this study. These consumers are referred to as respondents, who assist researchers in completing the questionnaires sent to them. The data collected from respondents is compiled, summarized, and then processed using SEM PLS tools.

The population for this study consisted of all customers or users of online travel agents who had experienced at least one service failure. Following guidance from two references mentioned earlier, the study employed thirty (30) indicators to measure four (4) variables. Consequently, the minimum required sample size was calculated by multiplying the number of indicators by 10, yielding 300 respondents (Hair et al., 2020). This study applied a non-probability sampling method, where the likelihood of each individual being selected is unknown (Ghozali, 2020). Specifically, purposive sampling was used, a technique in which participants are selected based on criteria considered critical to the study, ensuring that the selected sample possesses characteristics relevant to the research objectives.

The variables in this study are operationalized using established indicators from prior research. E-loyalty is measured through nine dimensions capturing cognitive, affective, conative, behavioral, attitudinal, and emotional loyalty, along with word of mouth, future purchase intention, and complaint behavior (Alnaim et al., 2022; Pratama et al., 2024). E-service recovery satisfaction is assessed through indicators related to problem resolution, compensation mechanisms, transaction and recovery processes, levels of happiness and satisfaction, and evaluations of how the issue was handled, the employee treatment, the procedures and resources used, and the overall recovery outcome (Mathew et al., 2020). E-recovery service quality includes responsiveness, compensation, contact, speed, and process quality (Komunda & Osarenkhoe, 2012). Lastly, e-trust is measured through security and privacy, system or website reliability, information transparency, and brand trust (Rohwiyati et al., 2024).

RESULTS

Multicollinearity testing was conducted to ensure that the indicators in the model did not experience high correlation problems that could interfere with parameter estimation. The test results in Table 1 show that the Variance Inflation Factor (VIF) values of all indicators are in the range of 1.000 to 1.841. According to (Hair, 2020), an indicator is considered free from multicollinearity problems if the VIF value is < 5.0. Thus, all indicators used in this study meet the eligibility criteria.

Table 1. Multicollinearity Test

Variable	Indicator Item	VIF
E-Recovery Service Quality* Age	X * Xmod1	1
E-Recovery Service Quality* Frequency	X * Xmod2	1.000
E-Recovery Service Quality (E-RSQ)	X01	1.000
	X02	1.485
	X03	1.230
	X04	1.359
	X05	1.425
	X06	1.215
	X07	1.441
	X08	1.391
	X09	1.515
	X10	1.507
	X11	1.664
	X12	1.311
E-Service Recovery Satisfaction * Age	XM1 * Xmod1	1.421
E-Service Recovery Satisfaction * Frequency	XM1 * Xmod2	1.000
E-Service Recovery Satisfaction	XM11	1.000
	XM12	1.841
	XM13	1.573
	XM14	1.645
E-Trust * Age	XM2 * Xmod1	1.529
E-Trust * Freq	XM2 * Xmod2	1.000
E-Trust	XM21	1.000
	XM22	1.661
	XM23	1.694
	XM24	1.332
	XM25	1.385
	XM26	1.239
	XM27	1.215
	XM28	1.594
E-Loyalty	Y11	1.640
	Y12	1.195
	Y13	1.270
	Y14	1.159
	Y21	1.272
	Y22	1.211
	Y31	1.201
	Y32	1.311
	Y33	1.369
	Y34	1.317
Frequency	Frequency	1.422
Age	Age	1.000

This indicates that each indicator in the research variables, including E-Recovery Service Quality, E-Service Recovery Satisfaction, E-Trust, and E-Loyalty, is independent and does not distort each other. This includes the moderating variables of age and frequency of visits, which show a VIF value of 1.000 and do not exhibit multicollinearity. With this requirement met, the measurement model in the study can be considered valid and suitable for proceeding to the structural testing stage. These results provide a strong basis for conducting a more accurate and reliable analysis of the relationship between variables.

Convergent validity testing was conducted to assess the extent to which the indicators used were able to explain the latent constructs being measured. Based on the data processing results in Table 2, all indicators in the research variables had factor loadings above 0.70, which means they met the minimum criteria according to (Hair, 2020). This shows that each indicator was valid in representing its respective construct.

Table 2. Convergent Validity Test

Variable	Item	X	XM1	XM2	Xmod1	Xmod2	Y
E-Recovery Service Quality	X01	0.706					
	X02	0.724					
	X03	0.731					
	X04	0.723					
	X05	0.738					
	X06	0.714					
	X07	0.708					
	X08	0.737					
	X09	0.710					
	X10	0.760					
	X11	0.735					
	X12	0.718					
E-Service Recovery Satisfaction	XM11		0.835				
	XM12		0.769				
	XM13		0.758				
	XM14		0.804				
E-Trust	XM21			0.733			
	XM22			0.728			
	XM23			0.712			
	XM24			0.713			
	XM25			0.758			
	XM26			0.717			
	XM27			0.707			
	XM28			0.737			
E-Loyalty	Y11						0.709
	Y12						0.725
	Y13						0.737
	Y14						0.712
	Y21						0.741
	Y22						0.73
	Y31						0.722
	Y32						0.73
	Y33						0.73
	Y34						0.714
Frequency	Frequency					1	
Age	Age				1		

Based on Table 2, the indicators for all variables in this study demonstrate strong convergent validity. For E-Recovery Service Quality loadings range from 0.706 to 0.760, while E-Service Recovery Satisfaction shows loadings of 0.758–0.835, indicating reliable measurement of recovery service quality and satisfaction. E-Trust loadings of 0.707–0.758 confirm that security, transparency, and reliability effectively capture customer trust. E-Loyalty indicators range from 0.709 to 0.741, showing consistent measurement of loyalty.

Construct reliability analysis, using Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE), confirms that all latent variables meet the validity and reliability criteria (Cronbach's Alpha > 0.70, CR > 0.70, AVE > 0.50) (Hair, 2020; Dewi, 2024).

Table 3. Cronbach's Alpha Analysis

Variable	Alpha	rho_A	CR	AVE
E-Recovery Service Quality	0.918	0.919	0.930	0.526
E-Recovery Service Quality*Age	1.000	1.000	1.000	1.000
E-Recovery Service Quality*Visit Frequency	1.000	1.000	1.000	1.000
E-Service Recovery Satisfaction	0.803	0.817	0.870	0.627
E-Service Recovery Satisfaction *Age	1.000	1.000	1.000	1.000
E-Service Recovery Satisfaction *Visit Frequency	1.000	1.000	1.000	1.000
E-Trust	0.872	0.874	0.899	0.527
E-Trust*Age	1.000	1.000	1.000	1.000
E-Trust*Visit Frequency	1.000	1.000	1.000	1.000
Age	1.000	1.000	1.000	1.000
Visit Frequency	1.000	1.000	1.000	1.000
E-Loyalty	0.900	0.901	0.917	0.526

The convergent validity and reliability tests show that all main constructs meet the required criteria, assessed using Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). Table 3 shows that E-Recovery Service Quality has $\alpha = 0.918$, CR = 0.930, AVE = 0.526; E-Service Recovery Satisfaction $\alpha = 0.803$, CR = 0.870, AVE = 0.627; E-Trust $\alpha = 0.872$, CR = 0.899, AVE = 0.527; and E-Loyalty $\alpha = 0.900$, CR = 0.917, AVE = 0.526. These results indicate strong internal consistency and convergent validity, supporting the adequacy of the measurement model for structural analysis.

Discriminant validity using the Fornell–Larcker criterion shows that the square root of AVE for E-Recovery Service Quality (0.725) exceeds its correlations with E-Service Recovery Satisfaction (0.693), E-Trust (0.635), and E-Loyalty (0.585), confirming good discriminant validity.

Table 4. Q-square Predictive Relevance and Determination Coefficient

Variable	SSO	SSE	Q^2 (=1-SSE/SSO)	R Square	Adjusted R Square
E-Recovery Service Quality	4080	4080			
E-Recovery Service Quality*Age	340	340			
E-Recovery Service Quality*Frequency	340	340			
E-Service Recovery Satisfaction	1360	960.145	0.294	0.481	0.479
E-Service Recovery Satisfaction *Age	340	340			
E-Service Recovery Satisfaction *Frequency	340	340			
E-Trust	2720	2104.628	0.226	0.442	0.438
E-Trust*Age	340	340			
E-Trust*Visit Frequency	340	340			
Age	340	340			
Visit Frequency	340	340			
E-Loyalty	3400	2593.106	0.237	0.468	0.450

The results of the coefficient of determination test presented in Table 4 show that the R-Square value for the E-Service Recovery Satisfaction variable is 0.481, while E-Trust is 0.442, and E-Loyalty is 0.468. These values indicate that the exogenous variables in the model are able to explain the variance of the endogenous variables at a moderate level (Hair, 2020). In other words, approximately 48.1% of the variance in E-Service Recovery Satisfaction, 44.2% of the variance in E-Trust, and 46.8% of the variance in E-Loyalty can be explained by the constructs that influence them.

The predictive relevance test using the Q^2 (Stone-Geisser) method shows Q^2 values of 0.294 for E-Service Recovery Satisfaction, 0.226 for E-Trust, and 0.237 for E-Loyalty. Since all values are above zero, the model demonstrates predictive relevance, indicating that the endogenous variables can be reliably predicted by the exogenous variables,

confirming the structural model's predictive validity. The model's fit was assessed using the Goodness of Fit (GoF) test. The SRMR value of 0.055 is below the 0.08 threshold, indicating good model fit. The NFI value of 0.833 and the rms Theta of 0.099 further support the model's adequacy. These results collectively confirm that the proposed structural model has a strong fit and is appropriate for analyzing the relationships among constructs.

Table 5. Goodness of Fit and Model Fit Test

Test	Saturated Model	Estimated Model	Requirements	Conclusion
SRMR	0.055	0.055		
d_ULS	1.991	2.05		
d_G	0.56	0.563		
Chi-Square	1021.071	1028.349		
NFI	0.834	0.833		
rms Theta	0.099		p-value < 0.001	0.160 (p < 0.001)
Average Path Coefficient (APC)			p-value < 0.001	0.464 (p < 0.001)
Average R-squared (ARS)			p-value < 0.001	0.456 (p < 0.001)
Adjusted R-squared (ARRS)			< 5	1.334
Average Block VIF (AVIF)			Strong > 0.360	0.833
Goodness of Fit			p-value < 0.001	0.160 (p < 0.001)

The model fit results in Table 5 show an Average Path Coefficient (APC) of 0.160, significant at $p < 0.001$, indicating that the relationships among the constructs are statistically meaningful. The Average R-squared (ARS) of 0.464 and Adjusted R-squared (ARRS) of 0.456, both significant at $p < 0.001$, demonstrate that the model explains the endogenous variables effectively, supporting its suitability for hypothesis testing. Additional fit indicators confirm these findings. The Average Block VIF (AVIF) of 1.334 is well below the threshold of 5, showing no multicollinearity issues. The Goodness of Fit (GoF) value of 0.833, exceeding the strong criterion (>0.360), indicates an excellent model fit. Overall, these results confirm that the research model meets all adequacy requirements and is appropriate for further analysis.

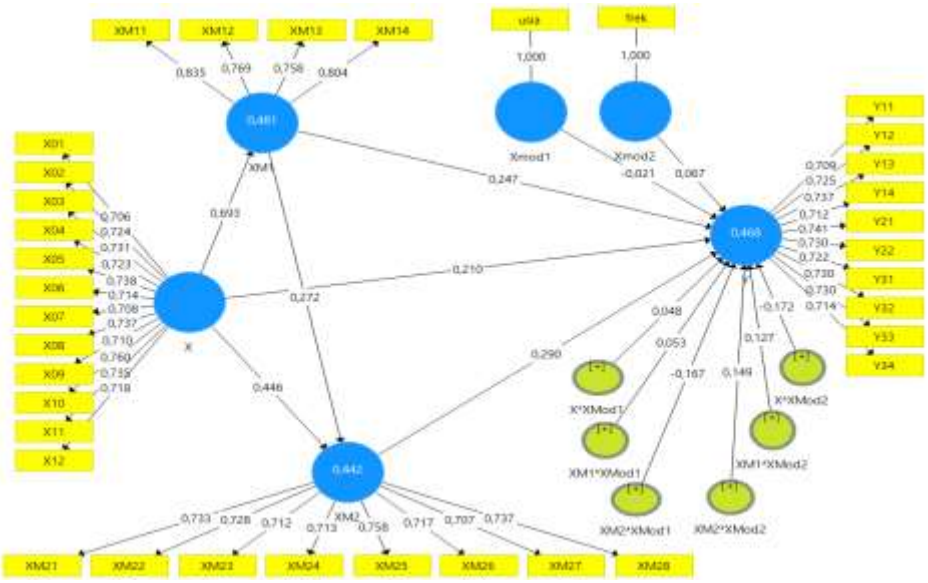

Figure 2. Inner Model Output

Table 6. Hypothesis Testing Results

Path	Original Sample	Sample Mean	Standard Deviation	T-Statistics	P-Values	Description
E-Recovery Service Quality→ E-Service Recovery Satisfaction	0.693	0.696	0.032	21.475	0.000	Accepted
E-Recovery Service Quality→ E-Trust	0.446	0.443	0.059	7.577	0.000	Accepted
E-Recovery Service Quality→ E-Loyalty	0.210	0.211	0.070	2.994	0.003	Accepted
E-Recovery Service Quality *Age → E-Loyalty	0.048	0.050	0.065	0.734	0.463	Not Accepted
E-Recovery Service Quality *Visit Frequency→ E-Loyalty	-0.172	-0.174	0.063	2.732	0.007	Accepted
E-Service Recovery Satisfaction → E-Trust	0.272	0.274	0.063	4.321	0.000	Accepted
E-Service Recovery Satisfaction→ E-Loyalty	0.247	0.249	0.071	3.468	0.001	Accepted
E-Service Recovery Satisfaction*Age → E-Loyalty	0.053	0.049	0.064	0.830	0.407	Not Accepted
E-Service Recovery Satisfaction *Visit Frequency →E-Loyalty	0.127	0.126	0.068	1,869	0.062	Not Accepted
E-Trust →E-Loyalty	0.290	0.286	0.060	4.801	0.000	Accepted
E-Trust *Age → E-Loyalty	-0.167	-0.170	0.064	2.608	0.009	Accepted
E-Trust *Visit Frequency → E-Loyalty	0.149	0.155	0.058	2.549	0.011	Accepted
Age → E-Loyalty	-0.021	-0.018	0.042	0.516	0.606	Not Accepted
Visit Frequency -> E-Loyalty	0.067	0.069	0.041	1.625	0.105	Not Accepted

Based on Table 6 and Figure 2, hypothesis testing results indicate that E-Recovery Service Quality (X) significantly affects E-Service Recovery Satisfaction (XM1, $\beta = 0.693$, $p < 0.001$), E-Trust (XM2, $\beta = 0.446$, $p < 0.001$), and E-Loyalty (Y, $\beta = 0.210$, $p = 0.003$), confirming its key role in enhancing satisfaction, trust, and loyalty. Age does not moderate X's effect on loyalty, while visit frequency weakens it ($\beta = -0.172$, $p = 0.007$). XM1 positively influences XM2 ($\beta = 0.272$, $p < 0.001$) and Y ($\beta = 0.247$, $p = 0.001$), though neither age nor visit frequency significantly moderates these paths. XM2 also significantly affects Y ($\beta = 0.290$, $p < 0.001$); here, age weakens the effect ($\beta = -0.167$, $p = 0.009$), while visit frequency strengthens it ($\beta = 0.149$, $p = 0.011$). Direct effects of age and visit frequency on loyalty are not significant.

Table 7. Results of Hypothesis Testing on the Mediating Effect

Path	Coef	Boot	SD	t-stat	p	Description
E-Service Recovery Satisfaction → E-Loyalty	0.079	0.078	0.024	3.243	0.001	Mediating
E-Recovery Service Quality → E-Trust	0.189	0.191	0.045	4.184	0.000	Mediating
E-Recovery Service Quality→ E-Loyalty	0.355	0.354	0.053	6.675	0.000	Mediation

Based on Table 7, mediation analysis shows that E-Service Recovery Satisfaction (XM1, $\beta = 0.079$, $t = 3.243$, $p = 0.001$) and E-Trust (XM2, $\beta = 0.189$, $t = 4.184$, $p < 0.001$) significantly mediate the effect of E-Recovery Service Quality (X) on E-Loyalty (Y), while the direct effect of X on Y remains strong ($\beta = 0.355$, $t = 6.675$, $p < 0.001$). Key findings include: 1) E-Recovery Service Quality positively influences E-Service Recovery Satisfaction, E-Trust, and E-Loyalty, with both satisfaction and trust enhancing loyalty; 2) Moderation effects are inconsistent: age weakens the trust–loyalty link, whereas visit frequency weakens the E-Recovery Service Quality –E-Loyalty path but strengthens the trust–loyalty relationship; 3) Loyalty is largely shaped by service recovery satisfaction and trust, highlighting the importance of tailored strategies; 4) E-Service Recovery Satisfaction and E-Trust are crucial mediators that reinforce the impact of service recovery quality on customer loyalty.

DISCUSSION

This study examined how e-recovery service quality influences e-loyalty among Online Travel Agent (OTA) customers in Indonesia, with e-service recovery satisfaction and e-trust as mediating factors, and age and visit frequency as moderators. The findings demonstrate that high-quality e-recovery, characterized by fast responses, clear solutions, fairness, and professional interactions directly enhances e-loyalty. Customers who perceive recovery processes as competent and empathetic are more likely to return to the platform, recommend it to others, and develop emotional attachment (Mashaqi et al., 2020; Syahril et al., 2022; Indrianti, 2022; Dhaniswara et al., 2023; Arifin et al., 2023). This aligns with Expectation-Confirmation Theory (ECT) and the Service Recovery Paradox, suggesting that customers who experience well-handled service failures can develop greater loyalty than those without prior issues (Parasuraman et al., 2021).

E-recovery service quality also significantly increases e-service recovery satisfaction, as customers value responsiveness, transparency, and the clarity of problem resolution. When recovery is prompt and professional, customers perceive that the company cares about their needs, which enhances satisfaction with the recovery process (Mashaqi et al., 2020; Parasuraman et al., 2021; Phan et al., 2021; Lova, 2022; Dowling, 2023; Arifin et al., 2023). In the OTA context, where cancellations, rescheduling, and system errors are common, a structured and accessible recovery process can transform negative experiences into positive perceptions, fostering both satisfaction and long-term loyalty.

The study further confirms that e-service recovery satisfaction positively influences e-trust, which in turn strengthens e-loyalty. Satisfied customers interpret effective recovery as a signal of reliability, integrity, and benevolence, enhancing trust in a digital context where direct interaction is limited (Karaca & Baran, 2023; Rohwiyati et al., 2024; Tullaili & Susanto, 2025). Trust serves as a critical bridge connecting satisfaction and loyalty, consistent with the commitment-trust theory and prior OTA research (Wilis & Nurwulandari, 2020; Kartika et al., 2021; Alnaim et al., 2022). Mediation analyses confirm that both e-service recovery satisfaction and e-trust effectively transmit the impact of e-recovery service quality to e-loyalty, reinforcing the notion that recovery quality alone is insufficient; its influence is amplified through the psychological processes of satisfaction and trust (Indrianti, 2022; Arifin et al., 2023; Dhaniswara et al., 2023; Ellitan & Suhartatik, 2023).

Regarding moderating effects, age generally does not significantly alter the relationships between e-recovery service quality, e-trust, and e-loyalty, indicating that all age groups value competent recovery and trust equally (Tseng, 2021; Ellitan & Suhartatik, 2023). However, older customers may exhibit lower translation of satisfaction into loyalty compared to younger users, who are more comfortable and accustomed to digital services (Wilis & Nurwulandari, 2020). Visit frequency demonstrates more nuanced effects: frequent OTA users exhibit stronger loyalty when trust is high but are less influenced by recovery service quality alone, likely due to elevated expectations from repeated platform interactions (Kusuma & Tseng, 2019; Indrianti, 2022). These findings suggest that loyalty-

building strategies should account for usage intensity, emphasizing trust reinforcement for frequent users while maintaining high-quality recovery for all.

Collectively, these results indicate that e-recovery service quality functions not only as a corrective mechanism but also as a strategic tool to enhance satisfaction, trust, and loyalty. OTAs can leverage this by implementing responsive digital complaint systems, transparent processes, and professional staff training. Prioritizing e-recovery strengthens customer relationships, fosters emotional commitment, and creates sustainable competitive advantage in the digital marketplace. Moreover, segmentation strategies may be necessary to address generational differences in translating satisfaction into loyalty, ensuring that both younger and older customers experience trust-building interactions (Albayrak et al., 2020; Mccollough et al., 2020).

The study underscores the centrality of e-recovery service quality in shaping customer loyalty. By combining fast, fair, and empathetic recovery with mechanisms to enhance satisfaction and trust, OTAs can convert service failures into opportunities for strengthening long-term customer relationships. Attention to usage patterns and demographic nuances further refines loyalty strategies, offering actionable insights for digital service management in highly competitive contexts.

CONCLUSION

This study demonstrates that e-recovery service quality plays a critical role in shaping e-loyalty among customers of Online Travel Agents (OTAs) in Indonesia. High-quality recovery services, characterized by fast responses, clear solutions, fairness, and professional interactions, directly enhance loyalty and also indirectly strengthen it through e-service recovery satisfaction and e-trust. Satisfaction with recovery processes positively influences trust, which in turn reinforces loyalty, highlighting the importance of both cognitive and emotional responses in digital service relationships. Moderation analysis indicates that age has limited influence, although older customers may translate satisfaction into loyalty less strongly, while visit frequency moderates certain relationships, with frequent users showing stronger loyalty when trust is high but reduced sensitivity to recovery quality alone.

These findings have practical implications for OTA managers. Investing in responsive, transparent, and fair e-recovery systems is essential, not only to resolve service failures but also to build long-term trust and loyalty. Segmentation strategies should consider usage frequency and generational differences, ensuring that younger or more frequent users continue to perceive value and reliability. Implementing live chat support, clear refund policies, timely problem resolution, and consistent communication can transform service failures into opportunities for stronger customer engagement.

The study has limitations, including its focus on Indonesian customers, reliance on self-reported survey data, and exclusion of other potential moderators such as digital literacy or platform type. Additionally, behavioral measures of loyalty were not captured. Future research could examine cross-cultural samples, incorporate longitudinal or behavioral data, and explore additional moderators such as platform familiarity or service type. Qualitative approaches may also provide deeper insights into the emotional and cognitive mechanisms that link recovery quality, satisfaction, trust, and loyalty in digital travel services.

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