



The Influence of Shopee's AI Chatbot Interactional Flow on Customer Loyalty Through Service Recovery Satisfaction Among Generation Z

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Abstract. This study aims to analyze the influence of Shopee's AI chatbot interactional flow on customer loyalty through service recovery satisfaction as a mediating variable among Generation Z consumers. The background of this study is driven by the prevalence of automated service failures in artificial intelligence-based customer services that risk decreasing user loyalty. The research method used is quantitative with a survey technique by distributing questionnaires to 100 Generation Z respondents selected through a purposive sampling approach. Data analysis was carried out using Structural Equation Modeling – Partial Least Squares (SEM-PLS) through the SmartPLS 4 application. The results of the study showed that interactional flow has a direct, positive, and significant effect on service recovery satisfaction. However, interactional flow is proven to have no significant direct effect on customer loyalty, and service recovery satisfaction also does not significantly influence customer loyalty. Furthermore, service recovery satisfaction is found to exert no mediating role within this model. This finding emphasizes that short-term interactional satisfaction with AI is insufficient to build long-term loyalty among Generation Z without concrete recovery solutions. Therefore, organizations are advised to enhance real problem-solving capabilities within their AI systems to retain digital customers.

Keywords: Customer Loyalty; Generation Z; Interactional Flow; Service Recovery Satisfaction; Shopee AI Chatbot.

1. BACKGROUND

Internet penetration in Indonesia reached 66.5% of the total population in the first quarter of 2024 (DataReportal, 2024). The e-commerce sector is recorded as the primary contributor to the digital economy, experiencing expansive growth in transaction volume (Badan Pusat Statistik, 2024). Shopee commands the top position as the most frequently accessed e-commerce platform by domestic consumers, reaching a percentage of 53.22% in early 2025 (GoodStats, 2025). This dominance is further reinforced by the preference of 72% of the Generation Z group, who prioritize Shopee as their main base for online transactions compared to its competitors (IDN Research Institute, 2024). The high engagement of this demographic group is directly proportional to the increasing volume of complaints that require systematic handling through automation technology. Consumers within the Generation Z segment demand high efficiency in every service recovery interaction within the digital space.

Shopee implements Artificial Intelligence (AI) chatbots to mitigate service failures automatically and on a massive scale. Critiques regarding the effectiveness of chatbots can also be found on consumer community platforms such as MediaKonsumen.com, which hosts various user experience related to transactions and customer service on e-commerce platforms. The flow experience on AI chatbots significantly influences the electronic loyalty of Generation Z on Shopee (Pebrianti et al., 2025). However, Haidar et al. (2024) highlight technical challenges in Natural Language Processing (NLP) that hinder the chatbot's

understanding of complex complaints. On the other hand, Claudia et al. (2025) demonstrate that although chatbot system quality affects satisfaction, service quality often only exerts an indirect impact on customer loyalty.

A literature gap emerges when complaint features are proven to have a positive effect on loyalty in general (Kurniawan et al. 2025), yet the smooth mechanism of interaction (interactional flow) within the context of service failure recovery has not been analyzed deeply as an independent variable. This study positions service recovery satisfaction as a mediating variable to bridge this gap. The primary focus of the research is directed toward the mechanism of AI-based chatbot interactions that have the potential to automatically reduce customer dissatisfaction during the service recovery process. This approach aims to evaluate whether a more humanized interaction structure can suppress customer churn rates resulting from technical service failures.

The evaluation in this study is focused on the interactional flow of Shopee's AI chatbot to identify communication pain points. The analysis is conducted on user perceptions regarding the seamlessness of information exchange during the service recovery process. Collaboration with the academic development unit at the Study Program level was undertaken to empirically validate the instruments and digital consumer behavior patterns. This synergy aims to align theoretical findings with standard operating procedures for customer service in the industrial sector. Primary data were gathered through a structured survey distributed to users who had experienced transactions issues on the Shopee application. The results of the analysis are positioned as a technical reference in developing more responsive bot communication algorithms to reduce conversational redundancy.

This research supports the achievement of the Sustainable Development Goals (SDGs), particularly SDG 9: Industry, Innovation, and Infrastructure, through strengthening internal research capacity relevant to industrial needs. Innovations in AI communication systems support the creation of reliable and transparent digital service infrastructure for the broader public. Optimizing the interactional flow of the bot represents a tangible form of concern toward the sustainability and efficiency of the national digital ecosystem. The resilience of the e-commerce sector depends heavily on the quality of technological innovations utilized to serve customers with precision. By resolving issues within the aspect of service recovery, this study drives the stability of digital economic growth in Indonesia. Public trust in online transactions is reinforced through the development of a more intuitive assistance system under rigorous academic supervision.

2. LITERATURE REVIEW

The Evolution of AI Chatbots in Digital Services

The evolution of digital services within e-commerce platforms has driven shifts in interaction patterns between companies and customers. Customer service has now integrated into the core user experience of a platform. To support the need for more efficient and responsive services, various companies have begun utilizing AI chatbots as a core component of their customer service systems. An AI chatbot is an artificial intelligence-based system designed to communicate with users through a conversational interface. Adam et al. (2020) explain that chatbots are utilized to provide automated responses, thereby generating customer service efficiency. On e-commerce platforms, chatbots are generally deployed to answer frequently asked questions, provide service information, and assist users throughout the system usage process. The deployment of chatbots on Shopee also constitutes a digital assistance service that supports customer needs in interacting with the platform (Yanti et al., 2026).

The implementation of AI chatbots in digital services is closely related to the service recovery process, particularly when customers encounter service failures while utilizing the platform. Le et al. (2023) explain that in service recovery situations, the quality of interaction plays a critical role in shaping the customer experience regarding the problem-solving process. Nonetheless, Ngai et al. (2021) demonstrate that chatbot implementation still faces limitations, especially when confronting highly complex customer issues. Responses that are less accurate, repetitive, or insufficiently contextual can negatively alter the user experience during the service process.

Based on these conditions, discussions regarding AI chatbots need to be viewed from the perspective of the interaction quality generated during the communication process. In this study, this interaction quality is conceptualized through interactional flow, which is subsequently linked to service recovery satisfaction and customer loyalty. These three concepts are utilized to explain how interaction experiences with AI chatbots can influence user evaluations of a service and their tendency to remain loyal to a digital platform.

Social Response Theory

Social Response Theory postulates that individuals cognitively tend to apply social norms and expectations when interacting with non-human entities that display anthropomorphic attributes. Adam et al. (2021) conceptualize this phenomenon through a compliance mechanism, defined as a specific form of response wherein users willingly fulfill requests. This theory asserts that in fast-paced and temporal interaction situations, users often experience cognitive resource constraints that prevent them from conducting deep, rational

evaluations. Consequently, individuals tend to rely on heuristic mechanisms or practical rule-of-thumb frameworks to determine their responses to stimuli provided by the system. This theory is utilized to explain how user interactions with AI chatbots can shape perceptions regarding communication quality (interactional flow).

Expectation-Confirmation Theory

Expectation-Confirmation Theory explains that the continuous use of a technology is determined by the user's confirmation of their initial expectations. Claudia et al. (2025) emphasize that system quality and service quality are determinant factors influencing user satisfaction. This satisfaction subsequently becomes the primary driver of a user's intent to continue using the service (continuance intention). This aligns with the core principle of ECT, where customer loyalty is fostered if the actual performance of the technology successfully confirms the user's expectations. This theory is utilized to explain how user experiences during the service recovery process influence satisfaction and ultimately shape customer loyalty.

Interactional Flow

Interactional flow refers to the quality of systematic and responsive information exchange between a user and an artificial intelligence system. This concept relates to the system's ability to respond to user inputs accurately, swiftly, and structurally. Adam et al. (2020) explain that the effectiveness of a chatbot is determined by its ability to provide real-time customer service through a conversational interface that mimics human interaction. A robust interactional flow is reflected when the system can process user inputs and provide corresponding feedback without significant communication barriers.

Flow is linked to user perceptions of ease and speed when operating a system. Le et al. (2023) indicate that during the service recovery process, interaction quality is influenced by the system's level of responsiveness and interactivity. Effective interactions make users feel that their problems are being handled appropriately. Conversely, rigid interactions can diminish the quality of the service experience. Therefore, interactional flow can be understood as the user experience of a communication stream that feels natural, clear, and supportive of the problem-solving process.

The primary characteristics of interactional flow in chatbots encompass several aspects. First, smoothness, which is the system's ability to provide rapid responses so that conversations occur naturally (Adam et al., 2020). Second, continuity, namely the chatbot's ability to maintain the context of a conversation so that users do not have to repeat the same information (Le et al., 2023). Third, clarity, which involves the use of easily understandable language to ensure information is clearly received by users (Adam et al., 2020). Fourth, relevance, representing

the accuracy of the chatbot's responses in addressing customer needs or complaints based on the system's knowledge base (knowledge-based system) (Ngai et al., 2021).

The relevance of interactional flow in this study lies in its role as a communication bridge between users and the platform during the service failure handling process. A well-designed interactional flow can minimize misinterpretations, accelerate problem resolution, and enhance the quality of the service experience perceived by users. Conversely, poor interactional flow has the potential to cause communication barriers, confusion, and discomfort, which can ultimately lower user perceptions of chatbot service quality (Adam et al., 2020). In this study, interactional flow is employed to examine how users evaluate the smoothness, continuity, clarity, and relevance of interactions when communicating with an AI chatbot within a digital service context. Therefore, interactional flow in this study is hypothesized to influence both service recovery satisfaction and customer loyalty.

Service Recovery Satisfaction

Service recovery refers to a series of actions taken by a service provider to respond to service failures and restore customer satisfaction (Tseng & Yong, 2025). This process is also executed through self-service technologies, including AI chatbots. Chatbots are deployed to handle complaints, provide information, and assist in resolving customer issues (Song et al., 2022). In line with this, service recovery satisfaction represents a customer's affective evaluation of the problem-handling they receive following a service failure (Yun & Park, 2022). This concept relates to satisfaction with the core product or service, as well as the rectification process undertaken by the company. This satisfaction emerges when customers feel that the recovery efforts provided have met or even exceeded their expectations regarding problem resolution (Song et al., 2022).

While service recovery refers to the concrete strategies or actions executed by a company through its service system, service recovery satisfaction refers to the psychological outcome of the customer's evaluation of those actions. In other words, service recovery focuses on what the chatbot does in response to a customer's problem, whereas service recovery satisfaction focuses on how the customer evaluates and perceives the quality of that handling. Based on a synthesis of research by Yun & Park (2022) and Song et al. (2022), there are three primary indicators used to measure service recovery satisfaction via chatbots: response speed, solution clarity, and problem-solving effectiveness. Response speed indicates the extent to which a chatbot can provide prompt replies to minimize customer waiting time. Solution clarity refers to the chatbot's ability to offer transparent, relevant, and easily understandable

instructions or answers. Meanwhile, problem-solving effectiveness reflects the chatbot's success rate in helping resolve customer issues accurately and adequately.

In this study, service recovery satisfaction is utilized to assess the extent to which users feel satisfied with the problem-handling or complaint process facilitated through the AI chatbot. This variable represents user evaluation of the service recovery quality they receive after experiencing issues on a digital platform. This variable also functions as a mediator in the relationship between interactional flow and customer loyalty.

Customer Loyalty

Customer loyalty is defined as a customer's deep commitment to continuously repurchase a preferred product or service consistently in the future, despite situational influences and marketing efforts having the potential to cause switching behavior (Srisusilawati et al., 2023). Loyalty is reflected in repeat purchase behaviors and the customer's attachment to the service provider. This attachment is formed through consumption experiences that are evaluated as satisfying and consistent (Singh et al., 2023). Customer loyalty can be understood as a long-term relationship form between customers and a company.

Customer loyalty has evolved into the concept of e-loyalty, which represents a customer's positive attitude toward a platform that drives sustainable reuse (Purwanto, 2022). Distinct from loyalty in conventional service contexts, e-loyalty is influenced by the quality of the digital experience perceived by users, including system ease of use, feature effectiveness, and the quality of technology-based assistance services. Jenneboer et al. (2022) explain that the use of chatbots possesses a strategic role in supporting customer loyalty because successful interactions with chatbots can strengthen user attachment to a brand or platform. Customer loyalty can be identified through several behavioral forms, namely repurchase, word-of-mouth, and primary choice (Srisusilawati et al., 2023; Jenneboer et al., 2022). Repurchase shows a customer's tendency to return to using platform services or perform sustainable transactions. Word-of-Mouth reflects a customer's willingness to provide positive reviews or recommend the platform to others based on personal experiences. And primary choice demonstrates a customer's tendency to position the platform as their main option compared to competitors, despite the availability of various alternatives or promotions from other service providers.

In this study, customer loyalty is utilized to evaluate users' tendency to remain with, re-select, and recommend a platform after gaining a specific service experience. This variable represents a form of long-term behavioral evaluation by users toward a digital platform, particularly after interacting with an AI chatbot during the service process.

Conceptual Framework

This study is predicated on the assumption that the quality of interaction between a user and an AI chatbot influences the user's evaluation of the digital service experience. Within the perspective of Social Response Theory, individuals systematically tend to treat technologies possessing interactive characteristics akin to humans as social communication partners. Consequently, the quality of communication flow becomes a pivotal factor in shaping user perceptions toward chatbot services. Interactional flow reflects the smoothness, clarity, relevance, and continuity of communication that transpires during the interaction process, particularly in service recovery and complaint-handling situations.

In a service failure scenario, the quality of interactional flow determines how users evaluate the service recovery process. Drawing upon Expectation-Confirmation Theory, user satisfaction is fostered when service performance meets or exceeds initial expectations. When a chatbot is capable of providing rapid responses, clear solutions, and effective problem resolution, users are more inclined to experience service recovery satisfaction. This satisfaction serves as an indicator that the service recovery process has been executed effectively and in alignment with user expectations.

Furthermore, service recovery satisfaction plays a critical role in fostering customer loyalty. Users who are satisfied with the handling of their problems tend to maintain a positive evaluation of the platform, which subsequently drives behaviors such as repurchase, word-of-mouth recommendations, and direct preference. Thus, positive interaction experiences can reinforce user attachment and drive customer loyalty. Consequently, within this research model, service recovery satisfaction is positioned as a mediating variable in the relationship between interactional flow and customer loyalty. Based on this framework, hypotheses regarding the relationships between these variables are formulated.

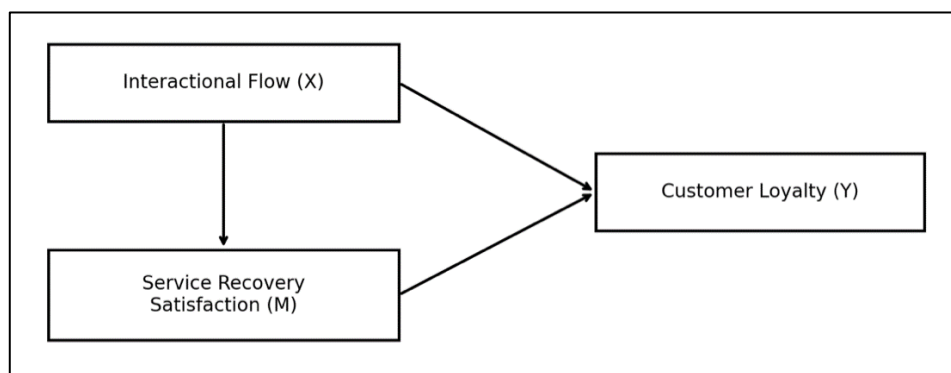


Figure 1. Conceptual Framework.

3. RESEARCH METHOD

This study utilizes a quantitative approach with a causal-associative research design to examine the influence of Shopee's AI chatbot interactional flow on customer loyalty through service recovery satisfaction. The data utilized in this study consist of primary data obtained directly from respondents by distributing online questionnaires via the Google Form platform.

The population in this study comprises all Generation Z consumers in Indonesia who have interacted with Shopee's AI chatbot. Given that the exact population size is undefined (unknown population), sample selection was conducted utilizing a non-probability sampling technique with a purposive sampling approach. The sample criteria established for this study include Generation Z respondents (born between 1997 & 2012) who have experienced a service failure on the Shopee platform and lodged complaints directly through the AI chatbot within the last 6 months. The sample size was determined to be 100 respondents, which is deemed to have fulfilled the minimum representative threshold for variance-based analysis.

Variable measurement in this research adopts instruments from prior studies adapted to the context of the research object. The interactional flow variable is measured based on the smoothness, responsiveness, and clarity of the AI communication flow. The service recovery satisfaction variable is measured through indicators of satisfaction toward complaint handling by the AI. Meanwhile, the customer loyalty variable is measured through the intensity of service reuse and positive recommendations. All statement items in the questionnaire are measured using a 5-point Likert Scale, ranging from a value of 1 (Strongly Disagree) to a value of 5 (Strongly Agree).

The data analysis technique employed is Structural Equation Modeling – Partial Least Squares (SEM-PLS) assisted by SmartPLS 4. The selection of this method is predicated on its capacity to test complex structural models (a combination of direct and mediating relationships) simultaneously without requiring strict data normality assumptions. The analysis is conducted through two primary stages: evaluation of the measurement model (outer model) to test the validity and reliability of the instruments, and evaluation of the structural model (inner model) through a bootstrapping process to test the significance of the research hypotheses.

4. RESULTS AND DISCUSSION

Research Results

Research Activity Description

The following section provides a descriptive overview of the research phases. This study focuses on quantitative data collection and analysis to examine the effect of Shopee's AI Chatbot Interactional Flow on customer satisfaction and loyalty among Generation Z. The completed research activities include instrument development, online field distribution via Google Forms reaching 100 targeted Gen Z Shopee users who have experienced service failure, data cleaning (including reverse-coded adjustment), and statistical computation using SmartPLS 4 with the Partial Least Squares - Structural Equation Modeling (PLS-SEM) approach.

Evaluation of the Measurement Model (Outer Model)

The following section explains the structural verification of the indicators. Measurement model evaluation is required to ensure research instrument validity and reliability prior to structural path assessment.

a. Convergent Validity Test

The initial calculation stage revealed that the indicator SRS4 possessed an outer loading value of -0.200. Because this score failed to meet the baseline requirement for reflective model estimation, SRS4 was eliminated (trimmed) from the structural canvas. The recalculated clean outer loading values, which comprehensively satisfy the social science threshold (> 0.50), are displayed in Table 1:

Table 1. Indicator Outer Loadings Value (SmartPLS).

Variable	Indicator	Outer Loading	Description
Interactional Flow (X)	IF1	0,721	Valid
	IF2	0,732	Valid
	IF3	0,638	Valid
	IF4	0,568	Valid
	IF5	0,630	Valid
Service Recovery Satisfaction (M)	SRS1	0,600	Valid
	SRS2	0,582	Valid
	SRS3	0,832	Valid

Customer Loyalty (Y)	CL1	0,691	Valid
	CL2	0,697	Valid
	CL3	0,693	Valid

b. Construct Reliability

The internal consistency of the latent constructs was evaluated using Cronbach's Alpha, Composite Reliability (rho_c), and Average Variance Extracted (AVE) as shown in Table 2:

Table 2. Construct Reliability Metrics Result (SmartPLS).

Variable	Cronbach's Alpha	rho_c	AVE	Description
Customer Loyalty (Y)	0,482	0,741	0,499	Reliable
Interactional Flow (X)	0,685	0,788	0,428	Reliable
Service Recovery Satisfaction (M)	0,431	0,717	0,465	Reliable

Although Cronbach's Alpha coefficients are under 0.70, the modern parameters of Composite Reliability (rho_c) for all latent blocks are soundly above the 0.70 threshold. Cronbach's Alpha often underestimates scale reliability in partial least squares configurations; thus, fulfilling the Composite Reliability benchmark legitimately confirms satisfactory construct reliability for inner model testing.

Structural Model Evaluation (Inner Model)

The following section measures the explanatory power and significance parameters of the structural pathways.

a. Coefficient of Determination (R^2)

Table 3. R-Square Scores (SmartPLS).

Endogenous Variable	R-Square	R-Square Adjusted	Predictive Level
Customer Loyalty (Y)	0,289	0,275	Moderate
Service Recovery Satisfaction (M)	0,271	0,264	Moderate

The R^2 score for variable M (0.271) indicates that the variance of Shopee's AI chatbot interactional flow accounts for 27.1% of service recovery satisfaction, while the remaining 72.9% is explained by factors outside this research model. Concurrently, the R^2 score for

variable Y (0.289) signifies that interactional flow and service recovery satisfaction simultaneously explain 28.9% of Generation Z's customer loyalty variance, leaving 71.1% to be dictated by external variables.

b. Direct Effects Path Coefficients

Based on the bootstrap computation, a direct path is statistically significant if the T-Statistics > 1,96 and the P-Value < 0,05.

Table 4. Direct Path Hypothesis Testing (SmartPLS).

Structural Pathway	Original Sample (O)	T-Statistics	P-Values	Decision
Interactional Flow → Service Recovery Satisfaction	0,521	7,231	0,000	Significant (H1 Accepted)
Interactional Flow → Customer Loyalty	0,354	1,943	0,052	Not Significant (H2 Rejected)
Service Recovery Satisfaction → Customer Loyalty	0,260	1,533	0,125	Not Significant (H3 Rejected)

c. Indirect Effects (Mediation Assessment)

Table 5. Mediation Path Hypothesis Testing (SmartPLS).

Hubungan Jalur Tidak Langsung	Original Sample (O)	T-Statistics	P-Values	Kesimpulan
IF → SRS → CL	0,136	1,486	0,137	Tidak Signifikan (H4 Ditolak)

Discussion

Interpretations of Results

a. The Influence of Interactional Flow on Service Recovery Satisfaction

The first hypothesis test (H1) confirms that Interactional Flow exerts a positive and highly significant direct impact on Service Recovery Satisfaction (O = 0,521, T = 7,231, P = 0,000). This empirical finding fully validates Social Response Theory (SRT). According to SRT, individuals naturally apply social rules and anthropomorphic expectations when engaging with interactive technologies.

The primary driver behind this significance is the capability of Shopee's AI chatbot to host an optimal dialogue structure, characterized by conversation smoothness, context continuity, semantic clarity, and response relevance. In urgent service failure scenarios, time constraints lead Gen Z users to evaluate the bot's seamless responsiveness as a proxy for the

platform's service quality, converting effective conversational flow into short-term emotional satisfaction.

b. Structural Relations to Customer Loyalty

Regarding structural pathways linked to long-term behavioral retentions, the data shows that the direct effect of Interactional Flow on Customer Loyalty (H2) is statistically insignificant ($O = 0,354$, $T = 1,943$, $P = 0,052$). Similarly, the direct impact of Service Recovery Satisfaction on Customer Loyalty (H3) is insignificant ($O = 0,260$, $T = 1,533$, $P = 0,125$) and the mediating bridge of Service Recovery Satisfaction (H4) is also not significant ($O = 0,136$, $T = 1,486$, $P = 0,137$).

This dynamic can be analyzed using Expectation-Confirmation Theory (ECT). ECT asserts that long-term continuous intention and loyalty only develop when actual system outcomes completely validate a user's ultimate expectations. Here, conversational comfort successfully creates short-term psychological relief during a complaint process. However, this process-based satisfaction fails to confirm substantial expectations regarding transactional results, such as concrete refunds, delivery assurances, or material compensation.

Consequently, the emotional comfort generated by artificial intelligence does not translate into long-term customer loyalty. Generation Z acts as highly pragmatic digital consumers with low platform switching costs; for them, conversational efficiency is merely a basic operational requirement (*hygiene factor*) rather than a value-added asset capable of building long-term brand dedication.

Analysis of Findings and Model Predictive Strength

a. Trimming Implications of Indikator SRS4

During the outer model verification, indicator SRS4 was removed due to a negative loading of -0.200 . Conceptually, SRS4 represents the user's perception of the robot's artificial empathy and emotional friendliness. The negative value indicates that this indicator did not align with the reflective construct of service recovery satisfaction. This implies that automated expressions of empathy, when unaccompanied by functional issue resolution, can increase customer frustration and fail to measure positive satisfaction.

b. Synthesis of Explanatory Power (R^2)

The structural framework produces moderate R^2 values (0.271 for Service Recovery Satisfaction and 0.289 for Customer Loyalty). A score of 0.289 indicates that the combination of interactional flow and service recovery satisfaction explains 28.9% of Generation Z's loyalty variations on Shopee. The remaining 71.1% depends on variables outside this model.

This moderate result is typical for the macro-scale e-commerce market, showing that digital consumer loyalty is multidimensional. Long-term behavioral retention cannot be achieved solely by optimizing self-service options like AI chatbots; it is driven by larger market factors, including product pricing structures, free shipping programs, physical logistical reliability, and digital payment security.

5. CONCLUSION AND RECOMMENDATIONS

The structural analysis using Variance-Based Structural Equation Modeling (VB-SEM) via SmartPLS 4 successfully answers all research questions and objectives of this study. Empirically, the quality of the interactional flow on Shopee's AI chatbot exerts a positive and highly significant direct impact on building service recovery satisfaction among Generation Z users. Factors such as dialogue smoothness, context continuity, clarity of articulation, and response relevance managed by Natural Language Processing (NLP) algorithms prove highly capable of meeting consumers' short-term psychological expectations when navigating basic operational service failures. However, this study reveals that the service recovery satisfaction felt by users during automated virtual assistance fails to stimulate long-term customer loyalty or continuous behavioral retention on the platform. Consequently, service recovery satisfaction does not function as a mediating mechanism to bridge interactional flow with loyalty, highlighting that the positive effects of an automated conversational interface dissolve at the process-satisfaction phase and lack the statistical strength to prevent customer churn.

By integrating Social Response Theory (SRT) and Expectation-Confirmation Theory (ECT), these findings provide critical and realistic insights into digital consumer behavior. Generation Z behaves as highly pragmatic and rational digital consumers with low platform switching costs. For this demographic, a smooth chatbot communication flow is merely a basic operational requirement (*hygiene factor*) rather than a value-added asset capable of commanding long-term behavioral allegiance. Their long-term loyalty in the macro e-commerce sector is multidimensional, driven heavily by tangible material recovery—such as instantaneous refunds, logistical resolution certainty, price stability, and promotional incentives—rather than artificial expressions of empathy from an automated system. This premise is further substantiated by the negative loading and subsequent trimming of the indicator representing automated empathy, confirming that artificial sympathy without concrete problem-solving capabilities serves only to escalate user frustration.

Based on these conclusions, several actionable recommendations are proposed for industry practitioners and institutional stakeholders. E-commerce platforms, particularly Shopee, should shift their AI development focus from basic conversational aesthetics toward embedding direct transactional execution authority within the chatbot framework. This integration will allow the AI system to resolve financial and logistical failures seamlessly in real-time, matching the pragmatic expectations of modern consumers. Additionally, collaborative research centers and academic institutions should continue utilizing these empirical insights to refine customer relationship management curricula, ensuring that theoretical frameworks remain aligned with the rapid evolution of digital industry operations.

This study recognizes certain limitations, primarily its exclusive focus on Shopee's platform and its reliance on a relatively compact sample size analyzed through quantitative variance-based structural models. These limitations restrict the generalizability of the findings to broader e-commerce ecosystems or diverse demographic segments. Therefore, future studies are strongly encouraged to expand the research horizon by conducting comparative analyses across multiple e-commerce platforms and integrating mixed-method or qualitative designs. Future researchers should also incorporate broader external variables such as logistical reliability, price sensitivity, and platform subsidy programs to capture a more comprehensive overview of the digital customer experience.

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