

E-Service Quality and Customer Loyalty in Digital Commerce: Examining the Mediating Effect of Customer Satisfaction

Agus David Ramdansyah

University of Sultan Ageng Tirtayasa, Indonesia. *ORCID*: 0000-0003-2520-9612

*Corresponding Author: Agus David Ramdansyah

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Article History	Abstract
Original Research Article	<p><i>This study aimed to investigate the relationship between e-service quality and customer loyalty in e-commerce contexts as well as the mediating role of customer satisfaction. Digital commerce has developed and the competitive pressure for online retailers in terms of service quality and retention management becomes an essential prerequisite for long-term organisational success. Using a quantitative research design, data were collected from 220 online consumers in Indonesia by using questionnaires. Research Methodology: The analysis of the collected data was conducted with Partial Least Squares Structural Equation Modeling (PLS-SEM) which includes examination of both measurement and structural parameters in satisfaction-oriented model.</i></p> <p><i>The results show that e-service quality has a positive and significant effect on customer satisfaction and customer loyalty. Customer satisfaction was positively influenced by e-service quality, and customer satisfaction partially mediates the relationship between e-service quality and customer loyalty. These Results emphasise that providing simple use of the platform, accuracy in information provision, security of transactions, and responsiveness—all key prerequisites for delivering quality digital services—are important to building customer experiences thereby encouraging customers to re-patronise. This study extends the knowledge of extant literature on digital consumer behavior by providing empirical evidence from Indonesia in using e-commerce. Moreover, the results offer important implications for practicing e-businesses to establish and strengthen customer relationships while achieving and sustaining a competitive edge in their electronic service quality.</i></p> <p>Keywords: e-service quality; customer satisfaction; customer loyalty; e-commerce; PLS-SEM; consumer behavior.</p>
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1. Introduction

The global business landscape, especially in the service and retail giants have continuously transformed due to rapid digitization of technologies and proliferation of internet access. One of the major changes that has come about this technological landslide is e-commerce, which radically changes the way consumers shop and make decisions. Due to the efficiency, even rules for buying are enhanced; because of digitization as it allows consumers to search for product information, compare deals and transact whenever or wherever they need (Laudon & Traver, 2023). Consequently, e-commerce has been an essential part of business and warp in modern day living.

Especially in the case of developing economies like Indonesia the e-commerce sector has grown tremendously this past couple years. The increase has been fueled by broader access to smartphones, a stronger internet and improved digital payments. As a result, online shopping has turned onto the rise for customers. To entrap this market, the big e-commerce players including Tokopedia, Shopee, Lazada as well as Bukalapak have been more fiercely competing by releasing various features or personalized services and promotional events to attract users and spend time on them. With increasing competition, organizations have moved their focus of strategies from acquiring

customers to retaining them and having a long-term relationship with the customer.

Therefore customer loyalty has become a strategic priority for e-commerce enterprises since it increases long-term profitability, positive word-of-

-mouth communication, and competitive advantage (Reichheld & Schefter, 2000). Loyal customers are often repeat buyers, promote a platform via people they know and stick with one service provider even when faced with attractive offers from rival firms. In digital commerce, establishing customer loyalty is related to the more positive perception of a level of service attained by consumers when online. As a result, providing better quality of service is one of the most important components for ensuring customer retention and in many cases continued business success in the e-commerce sector.

The concept of e-service quality has therefore gained considerable attention in marketing and information systems literature. Unlike traditional service quality, e-service quality focuses on consumers' evaluations of online service delivery processes through websites or mobile applications (Parasuraman et al., 2005). E-service quality encompasses various dimensions, including website efficiency, ease of navigation, responsiveness, privacy protection, transaction security, fulfillment reliability, and information quality. Since consumers interact with digital interfaces rather than face-to-face employees, the quality of electronic services becomes a critical determinant of consumer perceptions and behavioral intentions in online environments.

Early empirical findings repeatedly demonstrated that high e-service quality plays an important role in improving customers satisfaction across digital settings, customer loyalty and retention (CR), (Blut et al., 2015; Anderson & Srinivasan, 2003). Consumers will lower post-purchase satisfaction and favorable attitudes toward the service provider when they see an online platform of dependability, responsiveness, security, and usability on it. Based on Expectation-Confirmation Theory, customer satisfaction occurs when the actual consumption of a service meets or exceeds pre-consumption expectations (Oliver, 1997). Consequently, satisfied customers are likely to express stronger behavioral intentions such as repurchase intentions, continuous use of the service platform, positive word-of-mouth and long-term relationships with their service provider.

Despite extensive research examining the relationship between service quality, satisfaction, and loyalty, several important research gaps remain. First, many prior studies

have focused primarily on traditional retail or banking sectors, while empirical evidence within rapidly growing e-commerce ecosystems in emerging markets remains relatively limited. Consumer behavior in emerging economies may differ substantially due to variations in digital literacy, technological infrastructure, trust perceptions, and online shopping culture.

Second, although previous studies acknowledge the importance of customer satisfaction, the mediating role of satisfaction in explaining how e-service quality influences customer loyalty has not been fully explored in many e-commerce contexts. Understanding this mediation mechanism is important because customer loyalty may not emerge solely from functional service performance, but also through customers' emotional evaluations and overall experiences during online transactions.

Third, the rapid evolution of e-commerce platforms creates dynamic consumer expectations regarding service efficiency, convenience, and responsiveness. Consequently, there is a continuing need for updated empirical evidence regarding the mechanisms through which e-service quality shapes customer behavioral outcomes in digital commerce environments.

To address the identified gaps, this research aims to examine the impact of e-services quality on customer loyalty in the context of e-commerce platforms with customer satisfaction as a mediating mechanism. In particular, the study analyzes how delivery of good electronic services have personal impact on customer satisfaction that leads to increasing in loyalty of customers. Uncovering these relationships will help the research to provide a deeper understanding of how digital service experiences impact consumer behavior in online marketplaces. It is conjectured that the results will make a meaningful theoretical contribution to digital consumer behavior and relationship marketing fields, while at the same time providing practical direction for e-commerce managers and practitioners about designing efficient customer retention and loyalty-building strategies.

2. Literature Review and Hypotheses Development

Figure 1 shows the conceptual paradigm developed in this work. The model shows the direct association between the e-service quality and customer loyalty and the mediation role of customer pleasure to explain the relationship between these variables. The conceptual framework is based on the theory of relationship marketing and the expectation-confirmation theory that emphasises the relevance of service experiences and satisfaction in building long-term client connections.

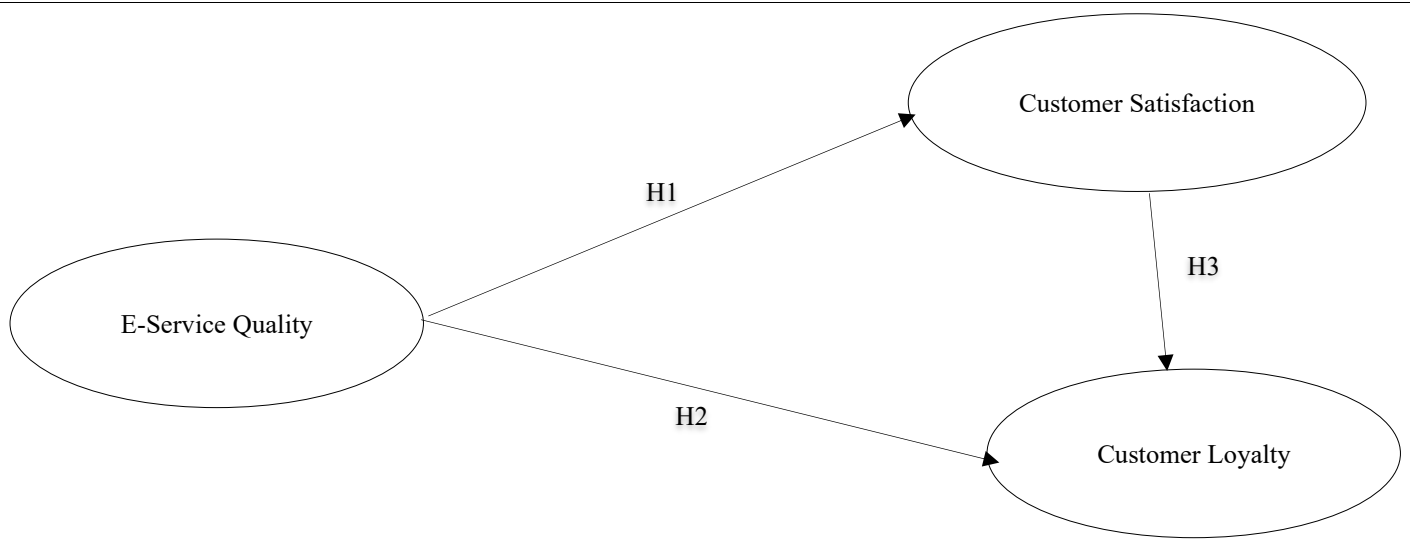


Figure 1. Conceptual Model

2.1 E-Service Quality

E-service quality refers to consumers’ overall evaluation of the quality and effectiveness of electronic services delivered through online platforms (Parasuraman et al., 2005). In digital commerce environments, e-service quality reflects how efficiently and effectively a website or mobile application facilitates online shopping, information searching, payment transactions, and customer support activities.

Unlike traditional service quality, which relies heavily on interpersonal interactions between employees and customers, e-service quality focuses primarily on technology-mediated interactions. Consumers evaluate online platforms based on various aspects such as website design, ease of navigation, responsiveness, transaction security, reliability, privacy protection, and information accuracy (Zeithaml et al., 2002). Because online transactions involve higher levels of uncertainty and perceived risk, consumers place substantial importance on the quality of digital service delivery.

Parasuraman et al. E-S-QUAL: A multidimensional scale for measuring electronic service quality, (2005). The model comprises four basic e-service quality dimensions: efficiency, system availability, fulfillment and privacy. It is more about how easy or fast to use an online platform. System Availability — System availability refers to the technical performance, accessibility & operational uptime of a website/application. Fulfillment is about the degree of success that service delivery fulfills — whether products and services are being delivered as promised, and on time or within an expected time frame. Privacy, however, deals with the protection and safety of customers personal as well as financial details during transactions over the Internet.

Many empirical studies have shown that e-service quality is an important factor influencing consumer attitudes and

behavioral intentions in e-commerce environments (Blut et al., 2015). Those customers who consider online services as convenient, dependable, trustworthy and responsive, they are more likely to form positive assessments of the platform. Such positive perceptions lead to a higher level of trust, greater satisfaction, and better loyalty toward the service provider. As a result, the quality of electronic services is an important aspect for determining customer experiences and future purchasing behaviors.

The provision of superior e-service quality is not just a technological or operational issue but has become a typifying Dale structure in an astoundingly competitive global digital landscape, individually determining the success of firms (or identifying inefficient enterprises as less successful than those that compete with them). Organizations with a purpose or an adequate user experience environment served up to the last click of delivery have a better chance of offering positive experiences, relationships (these build up with time) and customer loyalty. Therefore, the effect of e-service quality on major outcomes is still of significant concern in both academia and practice: In academia for advancing our understanding of theoretically relevant processes and in practice as organizations increasingly rely on improved organizational performance through relational patterns to sustain or win at competition.

2.2 Customer Satisfaction

Customer satisfaction refers to a consumer’s overall evaluation of a product or service experience based on the comparison between expectations and actual performance (Oliver, 1997). Satisfaction represents an affective and cognitive response that emerges after consumers interact with a service provider or complete a purchasing process.

In e-commerce environments, customer satisfaction is influenced by various aspects of online shopping

experiences, including website usability, transaction security, delivery reliability, product information accuracy, and customer service responsiveness ([Anderson and Srinivasan, 2003](#)). Since consumers cannot physically inspect products before purchase, their evaluations are highly dependent on the quality of digital interactions provided by the platform.

According to the Expectation-Confirmation Theory, satisfaction happens when expected and actual performance from a product/service matches or exceeds consumer expectations formed prior consumption (Oliver 1980). In terms of e-commerce, feelings and satisfaction are more positive when online services are reliable, efficient, and convenient for consumers. On the other hand, when service performance does not meet experience expectations, customer dissatisfaction may arise in the form of negative evaluations, negative electronic word-of-mouth and a higher likelihood of defection to competitive platforms.

Customer satisfaction has become synonymous with a fundamental operational construct of company success over the long-term due to an assortment of favorable behavioral outcomes typically described as sustainable consumer loyalty (Kotler & Keller, 2016). Satisfaction also helps reduce perceptions of risk and uncertainty in the context of online transactions in the environment of digital commerce. When consumers feel better about their experiences, they begin to gain faith and trust in the platform, which only serves to bolster the reactivity of consuming media from a given service provider.

Over the years, a lot of empirical studies have confirmed that there is a strong positive link between e-service quality and customer satisfaction (Blut et al., 2015; Anderson & Srinivasan, 2003). The studies show that making online services better benefiting consumers by giving them a superlative shopping experience, leading to better emotional response and evaluations of e-commerce elements. As a result, organizations that focus more on the delivery of high quality online services can achieve better customer satisfaction levels while reinforcing their competitive position in the digital business landscape.

Based on the above discussion, the following hypothesis is proposed:

H1: E-service quality positively affects customer satisfaction.

2.3 Customer Loyalty

Customer loyalty refers to a consumer's willingness and commitment to maintain an ongoing relationship with a particular company, brand, or digital platform through consistent purchasing behavior over time (Oliver, 1999). It reflects a favorable attitude that encourages customers to

repeatedly choose the same service provider despite the availability of alternative options in the marketplace. Loyalty is commonly manifested through behaviors such as repeat purchases, a reduced tendency to switch to competing platforms, and the active recommendation of products or services to other potential customers. As a result, customer loyalty is widely regarded as a key indicator of long-term business success and sustainable competitive advantage.

In the context of e-commerce, customer loyalty is especially important because consumers can easily switch between platforms with minimal effort or cost. Consequently, e-commerce companies must continuously maintain positive customer experiences to encourage long-term engagement and retention.

According to relationship marketing theory, customer loyalty develops through continuous interactions and positive experiences between consumers and service providers ([Morgan and Hunt, 1994](#)). Consumers who perceive superior service quality and experience high levels of satisfaction are more likely to develop emotional attachment and commitment toward online platforms.

Previous studies have shown that e-service quality significantly influences customer loyalty in online environments ([Srinivasan et al., 2002](#)). Efficient websites, secure transactions, responsive customer service, and reliable delivery processes contribute to stronger customer trust and long-term platform usage intentions.

Furthermore, customer satisfaction has been widely recognized as one of the strongest predictors of customer loyalty ([Oliver, 1999](#)). Satisfied consumers tend to exhibit favorable behavioral intentions, including repurchase intentions and positive word-of-mouth communication. In e-commerce settings, satisfaction plays an important role in reducing perceived risk and strengthening consumers' confidence in digital transactions.

Based on these arguments, the following hypotheses are proposed:

H2: E-service quality positively affects customer loyalty.

H3: Customer satisfaction positively affects customer loyalty.

2.4 Mediating Role of Customer Satisfaction

Customer satisfaction is widely considered an important mediating mechanism that explains how service quality influences customer behavioral outcomes. In online shopping environments, consumers first evaluate the quality of electronic services provided by e-commerce platforms. These evaluations subsequently shape their

satisfaction levels, which then influence loyalty intentions and future purchasing behaviors.

Salient points include Expectation-Confirmation Theory supporting the mediating role of customer satisfaction, whereby positive service experiences create a level of customer satisfaction that drives positive behavioral outcomes (e.g. customer loyalty, repeat patronage and repurchase intentions; Oliver 1997). Correspondingly, according to Relationship Marketing theory, long-lasting customer relationships are facilitated through the systematic provision of positive experiences and by meeting customers' emotional and functional needs. Each of the theoretical perspectives illuminates satisfaction as an important mediator of services quality impact on long-term customer behavior.

The role of customer satisfaction as a mediating variable between service quality and customer loyalty in digital commerce systems is well established from prior empirical studies (Anderson & Srinivasan, 2003; Blut et al., 2015). These results suggest that high service quality alone is insufficient for the formation of customer loyalty. In fact, consumers need more than that — they need to undergo a satisfying shopping journey before they firmly establish their commitment to a platform. As a result, customer satisfaction emerged as an essential intermediary of the relationships between quality electronic services and long-term customer loyalty on e-commerce platforms.

In the context of e-commerce, satisfaction may emerge from smooth website functionality, fast transaction processes, reliable delivery services, and responsive customer support. These positive experiences encourage consumers to revisit platforms and maintain long-term relationships with service providers.

Therefore, the following hypothesis is proposed:

H4: Customer satisfaction mediates the relationship between e-service quality and customer loyalty.

3. Methodology

3.1 Research Design

This study employed a quantitative with cross-sectional survey design to examine the influence of e-service quality on customer loyalty in e-commerce and customer satisfaction as an intervening variable. The quantitative approach is deemed relevant due to the nature of this study as it aims to empirically investigate causal relationships among the constructs within the research framework and statistically test the hypothesized model (Hair et al., 2022). The scope of the population was e-commerce users who had previous experience in purchasing product or services through online marketplaces to ensure that respondents

were well-informed with adequate knowledge and experience pertaining to the study variables.

The research also used a causal-explanatory design to investigate the direct impact of e-service quality on customer loyalty, as well as its indirect effect through customer satisfaction. Explanatory research designs are useful to assess relationships among variables and test theoretical propositions through empirical investigation (Sekaran & Bougie, 2016). Data were collected at one point in time through a structured online questionnaire, administered to respondents meeting the set eligibility criteria. The approach allowed data to be collected on consumer cognitions, emotions, experiences, and behavioral intentions in digital commerce contexts.

This research proposes a conceptual framework with three main constructs; E-Service Quality as independent variable, Customer Satisfaction as mediating variable and Customer Loyalty as dependent variable. A Structural Equation Modeling based on Partial Least Squares Structural Equation Modeling was utilized to assess the relationships between the latent constructs of this study. The best way to do this type of practice is through an exploratory research model; PLS-SEM was selected because it has been found very useful for this kind of predictive research involving latent variables with complex causal relationships (Hair et al., 2022). PLS-SEM analysis, provided a unique opportunity for the entire model evaluation (measurement and structural) thereby ensuring greater reliability and validity of results.

3.2 Population and Sample

The population of this study consisted of users of e-commerce platforms in Indonesia who had conducted online shopping transactions within the last six months. Popular platforms include Tokopedia, Shopee, Lazada, and Bukalapak.

The selection technique employed in this research is purposive sampling because the respondents are picked according to the criteria that are following the research objectives (Sugiyono, 2019). The following conditions had to be met by the respondents:

1. Individuals aged at least 17 years old;
2. Users who had made at least one purchase transaction through an e-commerce platform during the last six months;
3. Respondents who were willing to participate voluntarily in the study.

The study was conducted on an online questionnaire from 220 respondents. The sample size for this analysis was considered sufficient to use Partial Least Squares Structural

Equation Modeling, as it exceeded the minimum guideline generally advised for structural equation modeling analyses. According to Hair et al. A sample size of more than 200 participants is generally sufficient for producing accurate estimates of parameters and stable results in SEM research (2022). Consequently, sample sizes for this study were deemed adequate to facilitate accurate model estimation and hypothesis testing.

3.3 Data Collection Procedure

Data collection was conducted online using a structured questionnaire distributed through social media platforms, online communities, and messaging applications such as WhatsApp, Telegram, and Instagram. The online survey method was selected to facilitate broader respondent reach, improve efficiency, and accommodate respondents from different geographical regions in Indonesia.

The questionnaire items were taken from previous studies that had both content validity and measurement reliability (Malhotra, 2020), and they were modified to suit the research objectives before the main survey conducted. It ensured that the survey items reflect the concepts being examined, and it gave consistency with existing research practices. In addition to the above, all the participants were notified about objectives of the study and that information provided will be kept confidential but only used for academic research purposes.

This questionnaire consisted of two principal parts. The first section aims to collect demographic information from respondents, including variables such as gender, age and occupation as well as how often respondents shop online. The second part was gauge multi-items scales based on measures from key research constructs in the literature. These indicators have been employed for e-service quality,

customer satisfaction and customer loyalty in the e-commerce platform.

All measurement items employed a five-point Likert scale ranging from:

- 1 = Strongly Disagree,
- 2 = Disagree,
- 3 = Neutral,
- 4 = Agree,
- 5 = Strongly Agree.

Likert scales are widely used in behavioral and marketing research because they allow respondents to express their perceptions and attitudes systematically (Sekaran and Bougie, 2016). The online questionnaire remained open until the targeted number of 220 valid responses was achieved.

3.4. Measurement of Constructs

Table 1 presents the measurement of constructs used in this study. All constructs were adapted from well-established scales in prior studies to ensure content validity and reliability. The questionnaire items were measured using a five-point Likert scale ranging from 1 = “strongly disagree” to 5 = “strongly agree.” E-Service Quality (ESQ) was measured using five items adapted from prior e-service quality literature, focusing on platform usability, information accuracy, security, responsiveness, and transaction reliability. Customer Satisfaction (CS) was assessed through four items reflecting users’ overall evaluation and emotional response toward their online shopping experiences. Customer Loyalty (CL) was measured using four items related to repurchase intention, recommendation behavior, platform preference, and commitment to continued use.

Table 1. Measurement of Constructs

Construct	Definition	Code	Measurement Item	Sources
E-Service Quality (ESQ)	The overall evaluation of electronic service performance provided by e-commerce platforms	ESQ1	The e-commerce platform is easy to navigate	Parasuraman et al. (2005) ; Blut et al. (2015)
		ESQ2	The platform provides accurate information about products and services	Parasuraman et al. (2005)
		ESQ3	Transactions on the platform are secure and trustworthy	Parasuraman et al. (2005)
		ESQ4	The platform responds quickly to customer requests	Blut et al. (2015)
		ESQ5	The platform provides reliable delivery and transaction processes	Parasuraman et al. (2005)

Customer Satisfaction (CS)	The level of customer pleasure resulting from online shopping experiences	CS1	I am satisfied with my overall shopping experience on this platform	Oliver (1997); Anderson and Srinivasan (2003)
		CS2	The platform meets my expectations when shopping online	Anderson and Srinivasan (2003)
		CS3	I feel happy when using this e-commerce platform	Oliver (1997)
		CS4	Choosing this platform was a wise decision	Anderson and Srinivasan (2003)
Customer Loyalty (CL)	The intention of customers to continue using and recommending the platform	CL1	I intend to continue purchasing from this platform in the future	Zeithaml et al. (1996); Srinivasan et al. (2002)
		CL2	I would recommend this platform to others	Srinivasan et al. (2002)
		CL3	I prefer this platform over competing e-commerce platforms	Zeithaml et al. (1996)
		CL4	I am willing to remain loyal to this platform	Srinivasan et al. (2002)

3.5 Data Analysis Technique

Data obtained from respondents were analyzed by employing Partial Least Squares Structural Equation Modeling, supported by SmartPLS. The PLS-SEM approach was preferred due to its appropriateness for predictive research, mediation analysis, and exploring more complicated linkages between latent constructs (Hair et al., 2022). Moreover, this type of analysis is most useful for non-normally distributed data and modest sample sizes, which justifies its employment in the current study.

The data analysis was performed in two main phases of measurement model evaluation and structural model evaluation. For this purpose, the reliability and validity of constructs were assessed through outer loadings, Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) [44]. According to Hair et al. (2022) the indicator loadings must be above 0.70 in order to have an adequate indicator reliability and that AVE values of more than 0.50 (higher is better), show satisfactory convergent validity. These criteria were furnished to confirm that the measurement items appropriately represented their associated constructs and measured what they were presumed to measure.

The Fornell–Larcker Criterion and the Heterotrait–Monotrait Ratio (HTMT) are implemented to prove OG, MP, and adapted NMM validity. After assessing the measurement model, the structural model was subsequently

evaluated to determine the strength and significance of all relationships between study variables. In this phase, path coefficients and R (squared), effect size (f^2) in addition to predictive relevance (Q^2) were assessed along with the implementation of bootstrap procedures based on 5,000 resamples. These analyses revealed explanatory and predictable nature of the proposed model.

This research analyzed the mediated impact of customer satisfaction by analyzing the indirect association between e-service quality and customer loyalty. The statistical significance of the hypothesized relationships was determined by way of p-values and t-statistics generated from the bootstrapping procedure. Based on the recommendations of Hair et al. Hypotheses were considered statistically significant when the p-value was less than 0.05, and the t-statistic was greater than the corresponding critical value of 1.96 (Kotrlík et al., 2022). These selection criteria allow for a detailed evaluation of both direct and indirect effects within the suggested conceptual framework.

4. Results

4.1 Respondent Profile

In this study, a total of 220 valid replies were collected and analysed. The respondents were users of e-commerce platforms in Indonesia who had experience in making online buying transactions in the last six months. Table 2 presents the demographic characteristics of respondents.

Table 2. Respondent Profile

Profile	Category	Frequency	Percentage (%)
Gender	Male	101	45.9
	Female	119	54.1
Age	17–25 years	88	40.0
	26–35 years	79	35.9
	36–45 years	37	16.8
	>45 years	16	7.3
Occupation	Student	61	27.7
	Private Employee	96	43.6
	Entrepreneur	31	14.1
	Others	32	14.6
Online Shopping Frequency	1–2 times/month	73	33.2
	3–5 times/month	95	43.2
	>5 times/month	52	23.6

The respondent profile indicates that female respondents dominated the sample, accounting for 54.1% of the total participants. Most respondents were aged between 17 and 35 years, indicating that younger consumers represent the primary users of e-commerce platforms. In addition, the majority of respondents conducted online shopping between three and five times per month, suggesting relatively high engagement with e-commerce services.

4.2 Measurement Model Assessment

In this work, the measurement model assessment was performed to determine the reliability and validity of the

constructs utilised. The evaluation involved indicator reliability, internal consistency reliability, convergent validity and discriminant validity, based on the standards recommended by Hair et al. (2022).

4.2.1 Indicator Reliability

The dependability of the indicators was tested by considering the outer loading values of each of the measurement items. Outer loading values above 0.70 are an indication of good indicator reliability (Hair et al., 2022).

Table 3. Outer Loadings

Construct	Indicator	Loading
E-Service Quality	ESQ1	0.902
	ESQ2	0.887
	ESQ3	0.880
	ESQ4	0.883
	ESQ5	0.880
Customer Satisfaction	CS1	0.898
	CS2	0.895
	CS3	0.869
	CS4	0.870
Customer Loyalty	CL1	0.887
	CL2	0.875
	CL3	0.880
	CL4	0.882

The outer loading values calculated for all measurement indicators are shown in Table 3. The results further indicate maximum indicator loadings higher than the suggested threshold of 0.70, confirming satisfactory indicator reliability and convergent validity. The outer loadings were found to lie between 0.869 and 0.902, showing that there are strong relationships between the indicators and their respective latent constructs. This demonstrates the effectiveness of measurement items in this study to capture the concepts they are intended to measure. Accordingly, all

indicators passed the validity tests and were included in the following stages of analysis.

4.2.2 Internal Consistency Reliability

Cronbach's Alpha and Composite Reliability (CR) were used to examine internal consistency reliability. Values above 0.70 are considered acceptable reliability and internal consistency among measurement items (Hair et al., 2022). The results of the reliability test can be found in Table 4.

Table 4. Internal Consistency Reliability

Construct	Cronbach's Alpha	Composite Reliability
E-Service Quality	0.929	0.946
Customer Satisfaction	0.909	0.936
Customer Loyalty	0.901	0.931

The reliability analysis results indicate that all study constructs satisfied the recommended criteria for internal consistency reliability. Specifically, both Cronbach's Alpha and Composite Reliability values exceeded the minimum acceptable threshold of 0.70 for all constructs. The Cronbach's Alpha coefficients ranged from 0.901 to 0.929, while the Composite Reliability values varied between 0.931 and 0.946. These high reliability coefficients demonstrate a strong level of internal consistency among the measurement items, confirming that the indicators reliably and consistently measure their respective latent constructs. Consequently, the constructs used in the study can be considered dependable for further statistical analysis and hypothesis testing.

The results indicate that the AVE (Average Variance Extracted) values of all constructs exceeded the minimum acceptable value of 0.50: for average values, they were between 0.771 and 0.784; These results suggest that a significant amount of the variance in measurement indicators can be accounted for by their respective latent constructs. As a result, the indicators show sufficient convergence in terms of the concepts that they describe. With regard to these results, the measurement model can be referred as having adequate convergent validity for all constructs in this study.

4.2.3 Convergent Validity

The Average Variance Extracted (AVE) was used to determine convergent validity. According to (Hair et al., 2022), a construct with an AVE value more than 0.50 shows that it explains more than half of the variation of its indicators, which is appropriate convergent validity. The findings of the AVE are shown in Table 5.

4.2.4 Discriminant Validity

The Fornell-Larcker Criterion and Heterotrait-Monotrait Ratio (HTMT) were utilized to evaluate discriminant validity in terms of construct differentiation. According to Hair et al. As defined by Fornell and Larcker (1981), convergent validity is attained when the Average Variance Extracted (AVE) square root for a specific construct is larger than those of all other constructs in the model. It guarantees that every construct is more highly related to its indicators than to indicators of any other construct. The results from the Fornell-Larcker analysis are shown in Table 6 and evidence of discriminant validity between constructs in the measurement model.

Table 5. Convergent Validity

Construct	AVE
E-Service Quality	0.778
Customer Satisfaction	0.784
Customer Loyalty	0.771

Table 6. Fornell-Larcker Criterion

Construct	ESQ	CS	CL
E-Service Quality (ESQ)	0.882		
Customer Satisfaction (CS)	0.632	0.885	
Customer Loyalty (CL)	0.611	0.674	0.878

The results show the square root of the Average Variance Extracted (AVE) for each construct is higher than its correlations with other constructs in the model and fulfills

Fornell–Larcker criteria for evidencing discriminant validity. In particular, the square root of AVE values for E-Service Quality (0.882), Customer Satisfaction (0.885) and Customer Loyalty (0.878) were all higher than their corresponding inter-construct correlation coefficients. The fact that each of the constructs has higher variance with its own measurement indicators than with other constructs provides evidence for their empirical distinctiveness. Thus, the results provide robust support for sufficient discriminant validity in the measurement model.

Table 7. HTMT Ratio

Construct	ESQ
ESQ – CS	0.701
ESQ – CL	0.684
CS – CL	0.748

The Heterotrait–Monotrait Ratio (HTMT) was also used to test the discriminant validity between study constructs. According to Hair et al. When HTMT values are below the cut-off point of 0.90, they indicate that the constructs have enough discriminant validity from one another (Henseler et al., 2015). (2022) Results from Table 7 show that the HTMT coefficients across all counts were less than the cutoff value (0.684–0.748), indicating satisfactory reliability between constructs. Similarly, these results provide additional evidence to confirm the discriminant validity of the measurement model: that is, we can be confident that the constructs represented in our study are empirically distinct and conceptually accurate.

Table 9. Path Coefficients and Hypothesis Testing

Hypothesis	Relationship	Path Coefficient	t-Statistic	p-Value	Decision
H1	ESQ → Customer Satisfaction	0.632	12.841	0.000	Supported
H2	ESQ → Customer Loyalty	0.318	4.762	0.000	Supported
H3	Customer Satisfaction → Customer Loyalty	0.456	6.917	0.000	Supported

The findings reveal that E-Service Quality has a significant positive effect on Customer Satisfaction ($\beta = 0.632$, $t = 12.841$, $p < 0.001$), supporting H1. In addition, E-Service Quality significantly influences Customer Loyalty ($\beta = 0.318$, $t = 4.762$, $p < 0.001$), supporting H2. Customer Satisfaction also demonstrates a significant positive effect on Customer Loyalty ($\beta = 0.456$, $t = 6.917$, $p < 0.001$), thereby supporting H3. Overall, the results indicate that higher levels of e-service quality contribute to greater customer satisfaction and stronger customer loyalty among users of e-commerce platforms.

4.3 Structural Model Assessment

4.3.1 Collinearity Assessment

The Variance Inflation Factor (VIF) was used to examine collinearity among the predictor constructs. According to Hair et al. (2022), VIF values below 5 demonstrate that multicollinearity is not a significant concern in the structural model. The collinearity assessment findings are shown in Table 8.

Table 8. Collinearity Assessment

Relationship	VIF
ESQ → Customer Satisfaction	1.000
ESQ → Customer Loyalty	1.665
Customer Satisfaction → Customer Loyalty	1.665

The results indicate that all VIF values were below the required threshold of 5 ranging from 1.000 to 1.665. These results suggest that collinearity among the predictor factors was not a concern in this study and the structural model can be evaluated without multicollinearity issues.

4.3.2 Path Coefficients and Hypothesis Testing

The bootstrapping method with 5,000 resamples was used to test hypotheses by examining the significance of structural correlations. Support exists for hypotheses, if t-statistics exceed 1.96 and p-value < 0.05 at the 5 percent significance level (Hair et al., 2022). Path Coefficient Analysis Results are presented in table 9.

4.3.3 Coefficient of Determination (R^2)

To evaluate how the endogenous constructs are represented by their respective predictor factors, we used the coefficient of determination (R^2) in the structural model [34]. As Hair et al. (2018) state, R^2 values represent the models ‘explanatory power’ who indicating that was self-explanatory and is predicting a stronger by. But the biggest one goes to us who used it from 2022; with higher values being more in line with follow, explaining some aspects. The results of the R^2 analysis is shown in Table 10.

Table 10. Coefficient of Determination

Construct	R ²
Customer Satisfaction	0.399
Customer Loyalty	0.492

The coefficient of determination (R²) results reveal that E-Service Quality accounts for 39.9% of the variation in Customer Satisfaction (R² = 0.399), indicating a moderate level of explanatory capability. This finding suggests that a substantial proportion of customers' satisfaction levels can be attributed to their perceptions of the quality of electronic services provided by e-commerce platforms. In addition, the results show that Customer Loyalty attained an R² value of 0.492, implying that 49.2% of the variation in customer

Table 11. Effect Size (f²)

Relationship	f ²	Effect Size
ESQ → Customer Satisfaction	0.665	Large
ESQ → Customer Loyalty	0.142	Small
Customer Satisfaction → Customer Loyalty	0.238	Medium

The analysis of effect size (f²) shows that E-Service Quality has a large influence on Customer Satisfaction with an f² value of 0.665 indicating the largest such effect according to the rules of thumb established in this regard. The result indicates that the enhancement of e-service improves customer satisfaction significantly. On the other hand, E-Service Quality has a direct effect on Customer Loyalty with an f² value of 0.142 which gives a weak contribution when E-service quality is measured directly to loyalty. For Customer Satisfaction though, the effect on Customer Loyalty is moderate (f² value of 0.238). Overall, these results emphasize the significance of customer satisfaction as a mediating factor; in particular, the positive impact of e-service quality on customer loyalty is enhanced if customers have satisfying experiences and benefits from online shopping activities.

4.3.5 Predictive Relevance (Q²)

The predictive relevance (Q²) was evaluated using the blindfolding approach to test the ability of the model to predict the endogenous constructs. If the Q² values are more than zero, then the structural model has predictive relevance, according to Hair et al. (2022). The results of the Q² study are shown in Table 12.

Table 12. Predictive Relevance (Q²)

Construct	Q ²
Customer Satisfaction	0.301
Customer Loyalty	0.356

loyalty is jointly explained by E-Service Quality and Customer Satisfaction. These outcomes indicate that the proposed structural model possesses a moderate degree of predictive power and is reasonably effective in explaining the factors influencing customer satisfaction and loyalty in the e-commerce environment.

4.3.4 Effect Size (f²)

Effect size (f²) analysis was performed to evaluate the contribution of each external construct to the explained variance of the endogenous constructs. The impact sizes f² of 0.02, 0.15, and 0.35 are respectively considered minor, medium, and large, using the recommendations established by Hair et al. (2022). Results of effect size analysis are provided in Table 11.

The results show that all Q² values are higher than zero, Customer Satisfaction with a Q² value of 0.301 and Customer Loyalty with 0.356. The results show that structural model has enough predictive relevance and has exhibited satisfactory predictive power for the endogenous constructs studied in this study.

4.4 Mediation Analysis

4.4.1 Sequential Indirect Effects

Mediation study was performed to test the indirect influence of E-Service Quality on Customer Loyalty through Customer Satisfaction. The significance of the indirect effect was tested using the bootstrapping approach. Table 13 shows the results of the mediation analysis.

Table 13. Sequential Indirect Effects

Indirect Relationship	Indirect Effect	t-Statistic	p-Value
ESQ → CS → CL	0.288	5.982	0.000

The results of the mediation analysis show that the effect of E-Service Quality on Customer Loyalty mediated by Customer Satisfaction is positive and significant (β = 0.288, t = 5.982, p < 0.001). The result in this case is a statistical confirmation of the mediation role of Customer Satisfaction as an important mechanism given e-service quality effect on customer loyalty, are for your needs. To put it another way, quality of electronic services lead to higher satisfaction level from the customers which leads to improve loyalty towards the e-commerce platform. The

significance of both direct and indirect path indicates the presence of partial mediation thus, it can be concluded that e-service quality contributes to customer loyalty not only via a direct path but also indirectly through higher level of satisfaction. These results highlight the importance of providing better digital service experiences in order to develop satisfied and repeat customers during an ever more difficult e-commerce landscape.

4.4.2 Full Sequential Mediation

To further test the mediation mechanism, the direct and indirect effects of E-Service Quality on Customer Loyalty were simultaneously analysed. We employed the bootstrapping approach to test the significance of these effects. Table 14 illustrates the results.

Table 14. Direct and Indirect Effects

Relationship	Effect	p-Value
Direct Effect (ESQ → CL)	0.318	0.000
Indirect Effect (ESQ → CS → CL)	0.288	0.000

The results show that both the direct and indirect paths from E-Service Quality to Customer Loyalty are significant. The path coefficient for E-Service Quality ($\beta = 0.318, p < 0.001$) was also positive and significant; suggesting that enhancing electronic service quality can directly reinforce customer loyalty toward e-commerce platforms. In addition, the indirect effect through Customer Satisfaction is positive and statistically significant ($\beta = 0.288, p < 0.001$). These results show that Customer Satisfaction is a partial mediator of E-Service Quality, which correlates with Customer Loyalty. Thus, the effect of e-service quality on customer loyalty is manifested in two separate ways: a direct impact on loyalty and indirect through an improvement in satisfaction. This finding stresses the necessity of providing

high-quality electronic services not only (1) to immediately cultivate long-term customer loyalty but also (2) for inducing satisfactory customer experiences, which in turn further strengthens the potential for long-run loyalty and customer retention.

4.4.3 Variance Accounted For (VAF) and Mediation Type

The Variance Accounted For (VAF) was computed to determine the amount of the total effect mediated by the mediating variable. The VAF value is used to determine the kind and the strength of mediation in the structural model. Table 15 presents the results of the VAF analysis.

Table 15. VAF and Mediation Type

Variable	Value
Indirect Effect	0.288
Total Effect	0.606
VAF	47.52%
Mediation Type	Partial Mediation

The results indicate that the value of VAF is 47.52% meaning that approximately 47.52% of the effect of E-Service Quality on Customer Loyalty is transmitted through Customer Satisfaction. If the VAF value is between 20% and 80%, then the mediating effect is significant (Hair et al., 2022). Hence Customer Satisfaction partially mediates between E-Service Quality and Customer Loyalty.

4.4.4 Summary of Hypothesis Testing

The findings of the hypothesis testing performed in this study are summarised in Table 16. All given hypotheses were supported, confirming that the associations between the constructs are statistically significant and in accordance with the proposed research paradigm.

Table 16. Summary of Hypothesis Testing

Hypothesis	Statement	Result
H1	E-Service Quality positively influences Customer Satisfaction	Supported
H2	E-Service Quality positively influences Customer Loyalty	Supported
H3	Customer Satisfaction positively influences Customer Loyalty	Supported
H4	Customer Satisfaction mediates the relationship between E-Service Quality and Customer Loyalty	Supported

These study results support those that E-Service Quality is a key aspect affecting Customer Satisfaction and Customer Loyalty in the e-commerce context. The findings indicate that electronic service quality significantly increases customers' satisfaction with online sites and that this increased satisfaction leads to stronger customer loyalty. In

fact, Customer Satisfaction plays as an important mediator in E-Service Quality and Customer Loyalty, hence it is stated that Customer Satisfaction positively influence the Customer Loyalty user. This means that the effect of e-service quality on loyalty is confirmed not only directly but also indirectly via customer satisfaction. In conclusion, this

research demonstrated the strategic significance of providing high-quality electronic services in obtaining good customer experiences, satisfaction and retaining long-term customers to our organizational success.

5. Discussion

5.1 Theoretical Interpretation of Key Findings

The study aimed to examine the influence of e-service quality on e-commerce customer loyalty through mediating role of customer satisfaction. The results show that e-service quality has a positive and significant effect on customer satisfaction and customer loyalty. The findings also indicate that customer satisfaction has a notable positive direct effect on customer loyalty and partly mediates the relationship between e-service quality and customer loyalty. The results indicate that provision of high-quality electronic services could bring benefits, such as not only better customer experiences but also development of stronger and sustainable customer relationships.

This also explains the strong relationship between e-service quality and customer satisfaction; consumers value the level of digital services offered by online platforms. It was concluded that service attributes like ease of navigation, safe buying transactions, responsiveness to customers and system reliability can enhance the perceptions of customers as well as their shopping experiences. In support of Parasuraman et al. that e-service quality is a primary driver of customer assessments and satisfaction in the online context. (2005) Thus, e-commerce firms who increase service quality have potential to improve customer satisfaction and can strengthen their marketplace position.

Another main finding of the current research is that e-service quality directly and significantly affect customer loyalty. It demonstrates that consumers will continue to use and recommend e-commerce platforms when they believe the services delivered behind them are efficient, credible, and trustworthy. This finding aligns with prior literature indicating that enhanced service quality leads to better customer relationship management and long-term behavioral loyalty in the context of digital commerce (Zeithaml et al., 1996; Srinivasan et al., 2002). Thus, controlling superior electronic service quality may play an effective role for retaining customers and increasing their loyalty.

Additionally, customer satisfaction was identified as a key positive driver of customer loyalty and an important predictor of repeat purchasing behaviours and long term relationships with online platforms. This result is aligned with Expectation-Confirmation Theory by Oliver (1997), which establishes that satisfaction occurs when the service performance perceived fits or exceeds consumers

expectations. People are more satisfied with their experience of buying online, and they will feel faithful to the platform 5 times more.

R² results also only show moderate explanatory power associated with the proposed model. E-Service Quality explains a significant amount of the variance in Customer Satisfaction meanwhile Customer Loyalty is jointly explained by e-service quality and customer satisfaction. The results imply that since e-commerce customers are loyal to the functional and emotional aspects of service delivery, satisfying customer experiences lead to lasting loyalty in e-retailing. In this sense, when a company wants to enhance loyalty with its customers, it must focus not only on solving technical service performance but also positive and satisfactory experiences during the purchase process online with such customers.

5.2 The Sequential Mediation as a Core Theoretical Contribution

The most significant discovery in this study has been the identification of Customer Satisfaction as a mediating variable that exists between E-Service Quality and Customer Loyalty. From the mediation analysis, it was found that customer satisfaction partially mediates this relationship, meaning e-service quality on customer loyalty is passed indirectly and directly. This implies that not only does acoustic value have a direct effect on customer loyalty through its impact in electronic service quality, but also by enhancing customers' satisfaction with their online shopping experiences. Thus, customer satisfaction is a critical mediating mechanism that translates service quality perceptions into loyalty in the context of e-commerce.

This finding contributes to the theory taking a step closer in uncovering the psychological mechanism that sheds lights on how different dimensions of e-service quality give rise to specific consumer behavioral outcomes. In contrast to many earlier studies that have tended to focus primarily on service quality as the driver of customer loyalty, this study recognizes the mediating role of customer satisfaction in building and sustaining loyalty within digital exchanges. Implications The current results imply that customer satisfaction acts as a pivotal explanatory road link, reinforcing the build-up of customer loyalty and thus, contributing to the existing literature relating to aspects of digital consumer behaviour, service quality and relationship marketing. This is why this study has highlighted the importance of not only improving service quality but also achieving customer experiences that are satisfying for customers, so that long-term relationships with your e-commerce business can be established.

The partial mediation result suggests that customers may become loyal not only because of satisfactory experiences

but also because of direct perceptions of platform efficiency, security, and convenience. In other words, customers can develop loyalty through both emotional evaluations (satisfaction) and rational evaluations (service performance).

The mediation mechanism identified in this study enriches the understanding of relationship marketing theory in e-commerce contexts by emphasizing the importance of satisfaction as a relational bridge between service quality and long-term customer retention. This finding also reinforces the service quality–satisfaction–loyalty chain proposed in prior consumer behavior literature ([Anderson and Srinivasan, 2003](#)).

5.3 Contributions to Theory

This study contributes to the literature in several ways.

First, the study extends the application of e-service quality theory within the context of e-commerce platforms in emerging digital economies, particularly Indonesia. While previous studies have extensively examined e-service quality in developed countries, empirical evidence from rapidly growing Southeast Asian e-commerce markets remains relatively limited.

Second, this study integrates customer satisfaction as a mediating construct within the relationship between e-service quality and customer loyalty. The findings confirm that customer satisfaction plays a crucial role in transforming positive service experiences into long-term customer loyalty.

Third, the study supports the theoretical foundations of expectation-confirmation theory and relationship marketing theory by demonstrating that positive digital service experiences generate favorable consumer attitudes and behavioral intentions. The findings indicate that customers evaluate not only transactional efficiency but also emotional satisfaction when deciding whether to remain loyal to an e-commerce platform.

Fourth, the study contributes methodologically by applying PLS-SEM to analyze complex relationships among latent variables in digital commerce research. The statistical results confirm the reliability and validity of the proposed model and provide empirical support for the hypothesized relationships.

5.4 Practical Implications

The findings of this study provide several practical implications for e-commerce platform managers and digital marketers.

First, e-commerce companies should prioritize improving e-service quality dimensions such as system usability, transaction security, responsiveness, and service reliability.

Since e-service quality significantly influences both customer satisfaction and customer loyalty, enhancing these aspects can strengthen customer retention and competitive advantage.

For example, platforms such as Tokopedia, Shopee, and Lazada should continuously optimize user interface design, improve delivery accuracy, and provide faster customer support services to enhance overall consumer experiences.

Second, managers should recognize that customer satisfaction acts as a strategic mechanism for building long-term loyalty. Therefore, companies should regularly monitor customer feedback, evaluate customer experiences, and implement personalized service strategies to maintain high satisfaction levels.

Third, trust-building initiatives such as secure payment systems, transparent seller ratings, and reliable refund policies should be strengthened because customers are highly sensitive to risk and uncertainty in online shopping environments.

Fourth, digital marketing strategies should focus not only on attracting new users but also on maintaining existing customers through loyalty programs, personalized promotions, and superior after-sales services. Long-term customer retention is generally more cost-effective than continuously acquiring new customers.

5.5 Limitations and Directions for Future Research

Despite its contributions, this study has several limitations.

First, the study used a cross-sectional research design which limits the ability to understand changes in customer views and loyalty behaviour over time. Future research may use a longitudinal approach to analyse the evolution of e-service quality and customer satisfaction in dynamic digital environments across time.

Second, the sample was restricted to Indonesian e-commerce consumers. This may limit the extent to which findings can be generalised to other countries or cultural contexts. Future studies can do cross-country or cross-region comparisons to examine cultural differences in e-commerce consumer behaviour.

Third, this study focused only on customer satisfaction as a mediating variable. Other potential mediators such as trust, perceived value, user experience, or emotional engagement may also influence customer loyalty and should be explored in future research.

Fourth, the study examined e-service quality as a higher-level construct without differentiating its individual dimensions in detail. Future studies may analyze specific dimensions such as efficiency, privacy, responsiveness, and fulfillment separately to obtain more nuanced insights.

Finally, future research may integrate moderating variables such as age, digital literacy, shopping frequency, or platform type to better understand heterogeneous consumer behavior in digital commerce ecosystems.

6. Conclusion

In this study, the effect of e-service quality on customer loyalty in e-commerce is investigated with mediation analysis using customer satisfaction. The results showed that e-service quality has a strong effect on customer satisfaction and customer loyalty. Furthermore, customer satisfaction was shown to improve customer loyalty and to partially mediate the relationship between e-service quality and customer loyalty. These results suggest a fundamental role for electronic service quality in determining customers perceptions, experiences and behavioral intentions in the context of online commerce.

The results highlight the need for differentiation in an increasingly crowded e-commerce environment not just based on price but through higher quality electronic services. Service features such as security, reliability, response time and ease of use listed as well as most accurate information were the main contributors to satisfying customer experiences on online clients. High Service Experience in these service Dimensions, will lead to Increased Customer Commitment (Repeat Purchasing Behavior and Platform Recommendation) Thus, ensuring relatively high levels of e-service quality is a useful tool to increase customer retention and maintain long-term competitive advantage.

The study further emphasizes the crucial function of customer satisfaction as a middle chain to positively connect quality service to customer loyalty. The findings imply that the e-service quality affects customers emotional evaluations and overall satisfaction with the shopping experience rather than through technical performance or operational efficiency. Hence, e-commerce organizations should focus not only on performance-related aspects of service delivery but also on delivering experience and satisfaction that encourages trust, commitment and loyalty from customers in the long-term.

In general terms, this research complements the expanding literature on digital consumer behavior, service quality and relationship marketing. The study contributes empirical evidence on the relationships between e-service quality, customer satisfaction and customer loyalty, with important implications for both academic research and practical guidance. For managers, the results offer actionable insights for e-commerce platform operators on how to design customer retention programs, enhance their CRMs strategies and achieve sustainable business performance in

uncertain conditions embedded with fast-paced digitalisation.

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