E-Service Quality and E-Loyalty: The Mediating Role of E-Trust in E-commerce Companies

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Abstract

This paper investigates the mediating role of e-trust in the relationship between e-service quality and eloyalty in e-commerce companies. The research method uses non-probability sampling techniques specifically snowball sampling techniques. Likewise, data collection was carried out through an adopted questionnaire that featured a Seven-point Likert scale using a targeting 384 customers in e-commerce Companies. Analysis of research data was done using Structural Equation Model (SEM) with SmartPLS 4 version and SPSS software. Ease of Use and Reliability are key factors in E-Service Quality, shaping customer perceptions in e-commerce. E-Trust significantly mediates the link between E-Service Quality and E-Customer Loyalty, emphasizing trust's role in customer retention. However, Responsiveness and Security do not directly impact E-Service Quality, indicating that customers prioritize seamless interactions and reliability over immediate responses and security concerns. Additionally, E-Service Quality alone does not drive E-Loyalty, highlighting the need for trust in fostering long-term customer relationships. Enhancing Ease of Use and Reliability improves E-Service Quality and user experience. Since E-Service Quality does not directly influence E-Loyalty, businesses should prioritize building trust through transparent policies and secure transactions. These insights help e-commerce platforms refine service strategies to boost usability, reliability, and trust for better customer engagement and retention.

Key words: E-service quality, E-loyalty, E-trust, E-commerce and SERVQUAL.

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I. INTRODUCTION

The life of human beings has changed after the arrival of the Industrial Revolution and the Revolution. Internet The Industrial Revolution has brought changes to the manufacturing, marketing, production, and retailing sectors (Alim, 2019). On the other hand, the Internet Revolution has greatly strengthened businesses through the virtual business world known as E-Commerce (Wen et al., 2019). E-Commerce began in 1995 and has now become a part of our daily lives. specifically, online shops More have emerged. Initially, people preferred to shop directly, face-to-face with the seller and physically inspect the goods they wished to purchase. However, now people are increasingly transitioning to using online shopping facilities. In the present competitive scenario, it is very difficult to acquire and maintain loyal customers. Customer loyalty has a direct impact on the profitability and success of a business. Currently, businesses are more focused on retaining existing customers rather than acquiring new ones. Eloyalty has become an important aspect of ecommerce business due to the increasing level of competition in this field (Chen et al., 2014).As online channels continue to replace traditional shopping avenues, it is crucial for both businesses and consumers to understand and enhance service quality..

The significance of service quality and eloyalty in e-commerce lies in their role as critical factors for the success and competitiveness of online businesses. This research is significant because it explores the critical factors that influence e-service quality and e-loyalty within the context of electronic commerce. The findings of the study will help e-commerce companies to facilitate services as per the preferences of the customers to make them loyal towards the companies. The further researcher can gain knowledge from the present study and can conduct research on the same topic in wider perspective in near future.

E-commerce firms face intense competition online, as a competitor is just a click away (Eid, 2011). Moreover, consumers' trust and loyalty in e-commerce are undermined by the increase in fraud and scams, which can be attributed to inadequate security and privacy measures, as well as uncertainty regarding product quality and delivery (Hidayat et al.,2016; Khan, 2016). The e-commerce industry faces numerous complaints and concerns. Issues such as investment in technology infrastructure, and security measures, effective continuous improvement, delayed deliveries, poor after-sales support, and inconsistent product quality pose challenges. There has always been a trust problem associated with technologies (Chellappa & Pavlou, 2002).

Service quality refers to the overall judgment a customer has about the quality of a firm's delivery service. E-service quality is defined as a customer's overall "evaluations and judgments regarding the excellence and quality of e-service delivery in the virtual marketplace" (Lee & Lin, 2005). Consumer loyalty can be one of the main factors to strengthen market competitiveness and sustainable competitive advantage, because it is much cheaper to retain customers than to attract new consumers (Choi & Mai, 2018). Loyalty is the positive attitude of consumers towards a particular brand (Zeithaml, 2002; Margaretha Pink, 2017). The generic scale for service quality is the SERVQUAL, developed in 1988 by Parasuraman et al. (Lee & Lin, 2005; Yang & Fang, 2004). This scale, however, was adapted and termed e-SERVQUAL to measure online service quality (Zeithaml et al., 2002). E-loyalty is influenced by various factors, including service quality, customer satisfaction, trust, website design, security, privacy, and others. E-service quality is a multidimensional factor. There were several other dimensions mentioned in other articles and research works, but due to their low frequency, we primarily screened them out. However, after reviewing 20 articles on e-service quality that dealt with dimensions, it has selected four that appeared most frequently and were widely mentioned by different authors. These four dimensions are: Security, Responsiveness, Reliability, and Ease of use. Understanding customers' buying behavior in e-commerce and assessing the presence of behavioral loyalty are important. Trust influences customer loyalty, making it an essential factor for the success of e-commerce companies.

(Zeithaml et al., 2000) conducted exploratory research which revealed gaps in companies' interactions with their customers via the internet. They identified four gaps in the gap model of e-SQ: the information gap, design gap, communication gap, and fulfillment gap. On the company side, there are three potential disconnects that can occur during the process of designing, operating, and marketing websites, namely the information, design, and communication gaps. These gaps collectively contribute to the "fulfilment gap" on the customer's side, leading to a series of negative effects on perceived e-SQ, perceived value, purchase/repurchase behavior and (e-Loyalty). Studies have consistently shown that e-loyalty is strongly influenced by e-trust (Gwee & Chang, 2013). However, there is limited research on the relationship between e-service quality and e-trust, and the existing studies commonly utilize e-SERVQUAL or adapted versions of it (Cristobal et al., 2007; Ribbink et al., 2004; Yang & Fang, 2004), as well as the eTailQ scale. Overall, this study proposes a research model that integrates service quality, e-trust, and e-loyalty in the

context of electronic commerce sites. By examining the connections between e-service quality, e-trust, and e-loyalty, the study seeks to fill this gap. By doing this, it aims to offer more knowledge of how e-service quality affects customer loyalty by way of e-trust's mediating factors. This knowledge can aid ecommerce businesses in creating more potent plans to build customer loyalty and trust, which will ultimately increase their competitive advantage in the online market.

The objectives of the study are as mentioned below:

II. LITERATURE REVIEW

This section deals with theoretical and empirical reviews of the study which are as mentioned below:

H1: There is a significant effect of ease of use on E-loyalty

The Technology Acceptance Model (TAM) (Davis, 1989) posits that perceived ease of use significantly influences user adoption and continued use of technology. In an online shopping environment, ease of navigation, clear website design, and simple transaction processes enhance user experience, leading to greater consumer loyalty (Venkatesh et al., 2003). When customers find an e-commerce platform easy to use, they are more likely to return, increasing e-loyalty.

Gummerus et al. (2004) investigated how website design and ease of use impact consumer loyalty and found that user-friendly platforms significantly enhance customer retention. Additionally, Gefen et al. (2003) demonstrated that ease of use positively influences consumer trust, which is a precursor to e-loyalty. Kim and Forsythe (2008) confirmed that intuitive website interfaces reduce cognitive effort and enhance

- a) To assess the differences among gender, age, marital status and educational qualification regarding Security, Reliability, Responsiveness, Ease of use, E-trust and E-loyalty.
- b) To measure the relationship between Security, Reliability, Responsiveness, Ease of use and E-loyalty.
- c) To examine the effect of Security, Reliability, Responsiveness and Ease of use on E-loyalty.
- d) To analyze the mediating effect of E-trust on the relationship between E-Service Quality and E-loyalty.

customer engagement, ultimately leading to higher e-loyalty.

H2: There is a significant effect of reliability on E-loyalty

The Expectation-Confirmation Theory (ECT) (Oliver, 1980) provides a foundational framework for understanding the role of reliability in influencing e-loyalty. According to this theory, customer satisfaction is achieved when the perceived performance of a service meets or exceeds prior expectations. Reliability, which refers to the consistency and accuracy of service delivery, plays a crucial role in shaping consumer expectations and trust in online transactions. In ecommerce, a reliable service ensures timely order fulfillment, accurate billing, and secure transactions. which fosters customer confidence and loyalty (Zeithaml et al., 2002).

Yang et al. (2002) investigated the impact of reliability on consumer e-loyalty and found that customers who experience consistent service with minimal errors are more likely to remain loyal. Similarly, Zeithaml et al. (2002) identified reliability as a key dimension of eservice quality, demonstrating its significant effect on customer satisfaction and loyalty. In another study, Al-dweeri et al. (2017) confirmed that reliability positively influences customer trust, which in turn enhances eloyalty in online retail platforms.

H3: There is a significant effect of responsiveness on E-loyalty.

The ServQual model (Parasuraman et al., 1988) highlights responsiveness as a critical determinant of service quality and customer satisfaction. Responsiveness refers to the willingness and ability of service providers to assist customers promptly. In an e-commerce context, timely responses to customer inquiries, effective complaint resolution, and real-time assistance contribute to higher consumer satisfaction, fostering e-loyalty (Yang & Jun, 2002).

Yang and Jun (2002) conducted a study analyzing the relationship between responsiveness and consumer loyalty in ecommerce. Their findings revealed that businesses that promptly respond to customer concerns significantly enhance consumer trust and retention. Similarly, Holloway and Beatty (2003) found that responsiveness in online service interactions leads to increased customer engagement and repeat purchases. A study by Collier and Bienstock (2006) further confirmed that prompt responses and efficient issue resolution are critical drivers of eloyalty.

H4: There is a significant effect of security on *E-loyalty*.

The Commitment-Trust Theory (Morgan & Hunt, 1994) posits that trust is fundamental in fostering long-term relationships, particularly in online transactions. Security plays a vital role in establishing trust, as consumers need assurance that their personal and financial information is protected from cyber threats.

According to this theory, businesses that provide a secure online environment increase customer confidence, which in turn enhances e-loyalty (Bhattacherjee, 2002). Additionally, the Protection Motivation Theory (PMT) (Rogers, 1975) explains consumer behavior in response to perceived threats and security measures. PMT suggests that when consumers higher security perceive risks. their motivation engage in e-commerce to transactions diminishes. However, effective security measures, such as encryption and multi-factor authentication, can mitigate these concerns, thereby fostering e-loyalty (Dinev & Hart, 2006).

Yang and Jun (2002) conducted a study analyzing the impact of security on e-loyalty and found that consumers who feel their data is protected are more likely to continue engaging with an online platform. Their study revealed that the implementation of strong security measures directly correlates with customer retention. Likewise, Reichheld and Schefter (2000) examined the relationship between online security and consumer trust, demonstrating that customers who trust a website's security infrastructure exhibit higher levels of loyalty. Their findings suggest that ensuring transaction safety enhances consumer confidence and long-term commitment. Similarly, Hussain et al. (2019) investigated the influence of security on eloyalty in e-commerce settings. Their results showed that perceived security significantly affects consumer loyalty, particularly in online shopping environments where trust is a critical factor. The study emphasized that security mechanisms, such as secure payment gateways and data protection policies, contribute to greater e-loyalty.

H5: There is a significant effect of e-service quality on E-loyalty

The Commitment-Trust Theory (Morgan & Hunt, 1994) suggests that customer loyalty

stems from trust and commitment, both of which are reinforced by high service quality. E-service quality encompasses factors such as reliability, responsiveness, security, and ease of use, all of which contribute to customer satisfaction and long-term loyalty in an online context (Zeithaml et al., 2002).

Duffy (1998) examined the relationship between e-service quality and consumer loyalty, revealing a strong correlation between high-quality service delivery and repeat customer engagement. Zeithaml et al. (2002) found that various dimensions of e-service reliability quality, including and responsiveness, significantly impact retention. consumer Furthermore, Parasuraman et al. (2005) demonstrated that superior e-service quality enhances customer perceptions of value, fostering e-loyalty.

H6: There is a mediating effect of E-trust on the relationship between e-service quality and E-loyalty



Hussain (2019) conducted a study exploring the impact of e-service quality and e-trust on e-loyalty, finding that trust mediates the strengthening relationship, consumer commitment. Li et al. (2006) also found that significantly influences trust consumer retention, as customers are more likely to remain loyal when they perceive an online platform as trustworthy. A study by Amblee and Bui (2011) further confirmed that e-trust serves as a crucial bridge between service quality and customer loyalty, reinforcing the mediating effect of trust in e-commerce.



Figure 1 Research Framework

IV. Data Analysis and Interpretation

This section incorporates research design, population and sample size, sampling method, nature of sources of data, instruction for data collection and methods of data analysis.

Research design

The study employs a descriptive research design, aiming to define subjects by profiling

problems, people, or events through data collection and tabulation, as Cooper and Schindler (2003). This approach suits the study's aim of describing existing conditions without variable manipulation. Additionally, a causal-comparative design is utilized to explore relationships between independent, dependent and mediating variables postevent. This multifaceted methodological approach enhances understanding of the research phenomena and their interrelations

Population and sample size

The population of this research study consists of customers who make online purchases. Since the total number of online shoppers is uncertain and cannot be precisely counted, the exact population size is unknown. The sample size for this study has been determined using Yamane's (1967) formula. In case of population size is known, the Yamane formula for determining the sample size is given by: n = N/1+Ne2, Where, n = sample size, N = Population size, and e = Margin of error (MOE), e = 0.05. Thus, the sample size of the study is n = 384,

Sampling Technique

The sampling method is selected to identify and gather respondents from the overall population for data collection. This study employs a non-probability snowball sampling method to obtain the necessary sample.

Nature and sources of data and Instrument for data collection

Quantitative data for the study were collected from a primary source. An adapted questionnaire, based on the work of Parasuraman et al. (1988), was used for data collection. The questionnaire utilized a sevenpoint Likert scale (7 = Strongly Agree, 6 = Agree, 5 = Somewhat Agree, 4 = Neutral, 3 = Somewhat Disagree, 2 = Disagree, and 1 = Strongly Disagree) to capture participants' responses.

In the initial phase, key constructs and practices related to the selected variables were identified. In this context, three variables were incorporated into the study framework: Eservice quality as the independent variable, Etrust as the mediating variable, and E-loyalty as the dependent variable. Under the umbrella of the independent variable, four constructs were included: Ease of Use, Reliability, Responsiveness, and Security. A set of questions was designed to measure each independent, dependent, and mediating variable, totaling 24 items. To ensure clarity and accuracy, a pilot test was conducted by distributing the questionnaire to a sample of 30 respondents. Of the 450 questionnaires distributed, 384 fully completed responses were collected, resulting in an 88% response rate.

Statistical tools

The research study utilized Smart PLS and SPSS version 20, registered under LBC, to analyze the collected data. Various statistical tools were employed based on the appropriateness of the data. Descriptive statistics, including the mean and standard deviation (SD), were calculated to analyze and interpret customer responses. Additionally, a reliability test was conducted to assess the consistency of the research evaluate instrument. To the normal distribution of the data, a normality test, specifically the Kolmogorov-Smirnov (K-S) test, was performed. Based on the normality assessment, both parametric and nonparametric tests were applied in inferential statistics. Furthermore, correlation analysis was conducted to measure the relationship between variables, while regression analysis was used to examine the impact of independent variables on the dependent variable. Lastly, a mediation analysis was

performed to determine the direct and indirect effects among the variables.

IV. DATA ANALYSIS AND INTERPRETATION

This section deals with the analysis and results of the paper. The data collected have been analyzed using different tools of Smart PLS **Table 1** and SPSS Software and the results obtained have been incorporated into this section.

						Mean of	SD of
Variables	Items	Loadings	VIF	Mean	SD	construct	construct
	E1	0.897	3.253	4.638	1.816		
	E2	0.923	4.012	4.604	1.793	4.675	1.8375
	E3	0.888	2.593	5.130	1.750		
Ease Of Use	E4	0.788	1.810	4.341	2.055		
	EL1	0.883	2.507	5.615	1.453		
	EL2	0.898	2.953	5.034	1.767	5.182	1.6750
	EL3	0.862	2.603	5.018	1.806		
E-Loyalty	EL4	0.881	2.705	5.083	1.848		
	ET1	0.830	1.783	5.492	1.579		
	ET2	0.840	2.224	5.648	1.527	5.407	1.558
	ET3	0.885	2.823	5.562	1.525		
E-Trust	ET4	0.825	2.076	4.948	1.682		
	RL1	0.797	1.540	5.104	1.702		
	RL2	0.932	3.970	5.859	1.541	5.706	1.545
Reliability	RL3	0.868	3.264	6.156	1.393		
	RP1	0.834	1.244	5.771	1.568		
	RP2	0.657	2.363	3.172	1.847	4.309	1.841
	RP3	0.681	1.425	4.495	1.976		
Responsiveness	RP4	0.718	2.580	3.799	1.973		
	S 1	0.906	3.152	5.122	1.571		
	S 2	0.831	2.284	4.711	1.799	4.917	1.669
	S 3	0.896	2.739	5.081	1.531		
Security	S 4	0.754	1.583	4.768	1.778		
E-service							
quality	ESeq	1.000	1.000	5.367	1.523	5.367	1.523

Measurement Items Assessment/Assessment of Survey Items

Table 1 presents the assessment of measurement items for six latent variables using 23 scale items. The outer loading values for all items exceed the threshold of 0.7 or are close to it, indicating their significant contribution to measuring the respective al., constructs (Sarstedt et 2017). Additionally, the Variance Inflation Factor (VIF) values for all variables are below 10, and the tolerance values exceed 0.1, confirming that the independent variables are not highly correlated. This suggests the absence of multicollinearity among the variables, as the acceptable cutoff values for tolerance and VIF are 0.10 and 10, respectively (Pallant, 2010). The mean score for Ease of Use (4.675, SD =1.8375) indicates that respondents generally find the system easy to use, with responses mostly leaning toward agreement. However, the moderate standard deviation suggests some variability in opinions. E-Loyalty (Mean = 5.182, SD = 1.6750) shows that users exhibit strong loyalty toward the e-service, though individual responses vary. Similarly, E-Trust (Mean = 5.407, SD = 1.558) reflects a positive perception of trustworthiness, with being responses relatively consistent compared to Ease of Use and E-Loyalty.

The highest mean value is observed in Reliability (Mean = 5.706, SD = 1.545), implying that users find the e-service highly dependable, with responses being relatively stable. On the other hand, Responsiveness (Mean = 4.309, SD = 1.841) has the lowest mean, suggesting that users have concerns about how quickly and effectively the service responds. The higher standard deviation

indicates that perceptions of responsiveness vary among users. Security (Mean = 4.917, SD = 1.669) suggests that users generally view the system as secure, though its rating is lower than reliability and e-trust. The moderate standard deviation reflects some differences in perception.

Finally, E-Service Quality (Mean = 5.367, SD = 1.523) is rated highly, with relatively consistent responses among users. The analysis highlights that Reliability has the highest mean score, indicating strong user confidence in the system's dependability, while Responsiveness has the lowest mean, suggesting an area for improvement. The highest variability is found in Ease of Use (SD = 1.8375) and Responsiveness (SD = 1.841), indicating diverse opinions, whereas E-Service Quality (SD = 1.523) and E-Trust (SD = 1.558) exhibit the lowest variability, suggesting more consistent perceptions among respondents.

Table 2

			Composite	
	Cronbach's	Composite	Reliability	Average Variance
Variables	Alpha	Reliability (Rho_A)	(Rho_C)	Extracted (AVE)
Ease Of				
Use	0.898	0.91	0.929	0.767
Reliability	0.833	0.837	0.901	0.752
Responsiv				
eness	0.744	0.917	0.815	0.527
Security	0.869	0.886	0.911	0.721
E-Loyalty	0.904	0.912	0.933	0.776
E-Trust	0.867	0.872	0.909	0.715

Construct Validity and Reliability Assessment

Table 2 contains the internal reliability and validity of the constructs used in this study. The Cronbach's Alpha values of all constructs are above the standard threshold value of 0.705 (Bland & Altman, 1997), which indicates that the internal consistency of all constructs and validates the scale used for measuring each of the constructs is reliable.

Further, Composite Reliability (CR) rho_a and CR rho_c values are above 0.70, indicating construct reliability and validity (Saari et al., 2021; Hair et al., 2022). The Average Variance Extracted (AVE) values are above 0.50 threshold values, suggesting that the convergent validity of all the constructs is established (Hair et al., 2022). Hence, the results of the above table qualify all the quality criteria measures.

Table 3

One-Sample Kolmogorov Smirnov Test

	Security	reliability	ease	responsiveness	e-	e-	e-
			of use		service	trust	loyalty
					quality		
Kolmogorov-Smirnov Z	2.070	4.000	1.960	1.811	4.632	3.693	3.639
Asymp. Sig. (2-tailed)	.000	.000	.001	.003	.000	.000	.000

As shown in Table 3, since the Z value for security, reliability, e-service quality e-trust and e-loyalty does not lie between -1.96 to +1.96, security, reliability, e-service quality e-trust and e-loyalty do not follow a normal distribution. However, the Z value of ease of **Table 4**

use and responsiveness follows a normal distribution as their Z values lie between -1.96 to +1.96. For a normal distribution, we use parametric tests, and for a non-normal distribution, we use non-parametric tests.

Independent sample t test (Gender)

Variables	Gender of	N	Mean	t-value	p-value
	respondents				
	Male	136	4.5515	1 127	256
Ease Of Use	Female	248	4.7480	1.157	.230
Responsiveness	Male	136	4.2040	1.002	075
	Female	248	4.3669	1.092	.275

From table 4, it is shown that the p-value for Ease of Use is 0.256 and for Responsiveness is 0.275, both of which are greater than 0.05. This indicates that the alternative hypothesis is rejected at the 5% level of significance. In other words, there is no statistically significant difference between male and female customers' perceptions of Ease of Use and Responsiveness in e-service quality.

female customers suggest that their opinions on these aspects are similar. This similarity in perception may be due to male and female customers having comparable experiences with the e-service, similar expectations regarding ease of use and responsiveness, or exposure to the same user interface and service interactions, leading to a shared evaluation of these factors.

Furthermore, the mean values for male and

Table 5

Independent sample t test (Marital status)

Variables	Marital Status	Ν	Mean	T-Value	P Value
Ease Of Use	Married	51	4.3922	1 256	176
	Unmarried	333	4.7222	1.550	.170
Responsiveness	Married	51	4.0196	1 502	112
	Unmarried	333	4.3536	1.392	.112

From Table 5, it is shown that the p-value for Ease of Use is 0.176 and for Responsiveness is 0.112, both of which are greater than 0.05. Thus, the null hypothesis is accepted at the 5% level of significance, indicating that there is no statistically significant difference between married unmarried and customers' perceptions Ease Use of of and Responsiveness in e-service quality.

Furthermore, the mean values for married and unmarried customers suggest that their

opinions on these aspects are similar. This similarity may be due to both groups having comparable experiences with the e-service, similar levels of technological familiarity, or shared expectations regarding ease of use and responsiveness. Additionally, the nature of the e-service may provide a consistent user experience, regardless of marital status, leading to minimal variation in their perceptions.

Table 6

Variables Age		N	Mean	F Value	P Value
E OUI	Below 30	350	4.7043	1.010	315
Ease Of Use	30 To 40	34	4.4118		
	Total	384	4.6784		
	Below 30	350	4.3264	.596	.440
Responsiveness	30 To 40	34	4.1324		
	Total	384	4.3092		

One-way Anova table (Age of respondent)

From Table 6, it is shown that the p-value for Ease of Use is 0.315, which is greater than 5% (0.05). Thus, the null hypothesis is accepted at the 5% level of significance, indicating that there is no statistically significant difference between the opinions of different age groups regarding Ease of Use. The mean values for different age groups further confirm that their opinions on ease of use are similar. This may be due to the e-commerce website presenting its features in a user-friendly manner, making it easy for users of all age groups to understand navigate platform and the effectively.

Additionally, the table shows that the p-value for Responsiveness is 0.440, which is also greater than 5% (0.05). Thus, the alternative hypothesis is rejected at the 5% level of significance, meaning that different age groups share similar opinions regarding Responsiveness. The mean values indicate minimal variation in their perceptions. This may be due to the e-service providing a consistent level of responsiveness across all age groups, ensuring that users receive timely support and assistance regardless of their age. Additionally, advancements in technology customer service automation and mav contribute to a uniform experience for users of all age groups.

Table 7

One way Anova table (Qualification of respondent)

Variables Qualification		N	Mean	F Value	P Value
E OGU	Bachelor	261	4.7318	.886	.347
Ease Of Use	Master	123	4.5650		
	Total	384	4.6784		
	Bachelor	261	4.3257	.112	.738
Responsiveness	Master	123	4.2744		
	Total	384	4.3092		

From Table 7, it is shown that the p-value for Ease of Use is 0.347, which is greater than 5% (0.05). Thus, the alternative hypothesis is rejected at the 5% level of significance, indicating that there is no statistically significant difference in opinions on Ease of Use among customers with different qualification levels. The mean values further confirm that their perceptions are similar. This may be due to the e-commerce website being designed in a user-friendly manner, ensuring that individuals with varying educational backgrounds can easily understand and navigate the platform.

Furthermore, the table shows that the p-value for Responsiveness is 0.738, which is also

Table 8

nann whiney	0 lesi (Gender)				
Variables	Gender Of	Ν	Mean Rank	Z-Value	P-Value
variables	Respondents				
	Male	136	186.18		
Security	Female	248	195.96	.828	.408
	Total	384			
	Male	136	186.41		
Reliability	Female	248	195.84	.803	.422
	Total	384			
E Somico	Male	136	191.32		
E-Service	Female	248	193.15	.160	.873
Quanty	Total	384			
	Male	136	195.56		
E-Trust	Female	248	190.82	.401	.688
	Total	384			
E I oveltv	Male	136	192.04	061	
E-Loyalty	Female	248	192.75	.001	.952

Mann whitney U test (Gender)

greater than 5% (0.05). Thus, the alternative hypothesis is rejected at the 5% level of significance, meaning that customers with different qualification levels have similar opinions regarding Responsiveness. The mean values indicate minimal variation in their perceptions. This may be due to the eservice providing a consistent and standardized level of responsiveness across all customer groups, ensuring equal access to timely support and assistance regardless of educational background. Additionally, clear communication and efficient customer service may contribute to a uniform experience for users with different qualifications.

From Table 8, it is shown that the p-values for Security (0.408), Reliability (0.422), E-Service Quality (0.873), E-Trust (0.688), and E-Loyalty (0.952) are all greater than 0.05. Thus, the alternative hypothesis is rejected at the 5% level of significance, indicating that there is no statistically significant difference in the opinions of male and female customers regarding Security, Reliability, E-Service Quality, E-Trust, and E-Loyalty.

The mean values further confirm that male and female customers share similar

Table 9

perceptions of these factors. This may be due having to both genders comparable experiences with the e-service, similar expectations regarding security and reliability, and equal exposure to customer service features. Additionally. the standardized nature of e-commerce platforms ensures a uniform experience for all users, regardless of gender, contributing to minimal variation in their perceptions of e-service quality, trust, and loyalty.

Variables	Marital Status	Ν	Mean Rank	Z-Value	P-Value
	Married	51	175.87		.250
Security	Unmarried	333	195.05	1.151	
	Total	384			
	Married	51	173.73		.191
Reliability	Unmarried	333	195.38	1.308	
	Total	384			
E Samiaa	Married	51	180.33		.386
E-Service	Unmarried	333	194.36	.867	
Quanty	Total	384			
	Married	51	186.64		.684
E-Trust	Unmarried	333	193.40	.407	
	Total	384			
	Married	51	171.91		.153
E-Loyalty	Unmarried	333	195.65	1.428	
	Total	384			

Mann whitney U test (marital status)

From Table 9, it is shown that the p-value for Security is 0.250, for Reliability is 0.191, for E-service Quality is 0.386, for E-trust is 0.684, and for E-loyalty is 0.153, all of which are greater than 0.05. Thus, the alternative hypothesis is rejected at the 5% level of significance. This means that the opinions of married and unmarried customers are similar regarding Security, Reliability, E-service Quality, and E-loyalty in e-services.

Similarly, based on the mean values of male and female customers, it can be observed that their opinions on Security, Reliability, Eservice Quality, and E-loyalty are also similar. This may be due to a shared perception of eservice attributes across different demographic groups, possibly influenced by standardized service experiences, common usage patterns, or similar levels of digital literacy and expectations.

Table 10

Variables	Age Of Respondents	Ν	Mean Rank	Chi-Square Value	P-Value
	Below 30	350	193.54	.351	.553
Security	30 To 40	34	181.75		
	Total	384			
	Below 30	350	193.47	.308	.579
Reliability	30 To 40	34	182.50		
	Total	384			
	Below 30	350	193.41	.283	.595
E-Service Quality	30 To 40	34	183.13		
	Total	384			
	Below 30	350	193.97	.698	.404
E-Trust	30 To 40	34	177.38		
	Total	384			
	Below 30	350	193.97	.695	.404
E-Loyalty	30 To 40	34	177.41		
	Total	384			

Krushkal-Wallis H Test (Age)

Table 10 shows that the p-value is greater than 0.05, indicating that the null hypothesis is accepted at the 5% significance level with regard to Security, Reliability, E-service Quality, E-trust, and E-loyalty. Hence, there is no significant difference between customers below the age of 30 and those aged 30 to 40 in

terms of their perceptions of these factors. Based on the mean rank shown in the table, it is found that customers below the age of 30 have a more favorable opinion. This may be because older customers tend to be more emotionally attached and connected to ecommerce websites, leading to increased service engagement and customer retention.

Table 11

Variables	Qualification	Ν	Mean Rank	Chi-square	P value
variables	respondents			value	
	Bachelor	261	198.40	2.315	.128
Security	Master	123	179.97		
	Total	384			
	Bachelor	261	195.61	.653	.419
Reliability	Master	123	185.89		
-	Total	384			
E Comvioo	Bachelor	261	193.95	.148	.700
E-Service	Master	123	189.42		
Quality	Total	384			
E Transf	Bachelor	261	193.66	.089	.765
E-Irust	Master	123	190.05		

Krushkal-Wallis H Test (Qualification)

	Total	384			
	Bachelor	261	202.42	6.566	.010
E-Loyalty	Master	123	171.44		
	Total	384			

Table 11 shows that the p-value is greater than 0.05, indicating that the null hypothesis is accepted at the 5% significance level for Security, Reliability, E-service Quality, and E-trust. Hence, there is no significant difference between customers with a bachelor's degree and those with a master's degree in their perceptions of these factors. Based on the mean rank shown in the table, it is found that customers with a bachelor's

Table 12

Correlation

degree have a more favorable opinion. This may be because individuals with higher qualifications tend to be more emotionally attached and connected to e-commerce websites. leading to increased service engagement and customer retention. However, the p-value for E-loyalty is less than 0.05, leading to the rejection of the null hypothesis. This indicates a significant difference between customers with а bachelor's degree and those with a master's degree in their perception of E-loyalty.

variables (Security, Reliability, Ease of Use,

Responsiveness, E-Loyalty, and E-Trust) and

the dependent variable (E-Service Quality).

This suggests that improvements in these factors are likely to enhance overall E-Service

Quality perception.

Variables	Security	Reliability	Ease of	Responsiveness	E-	E-	E-
			Use		Service	Loyalty	Trust
					Quality		
Security	1	$.740^{**}$.621**	.423**	$.650^{**}$.564**	.694**
Reliability		1	.613**	.523**	.725**	.599**	.761**
Ease Of Use			1	.645**	.711**	.532**	.667**
Responsiveness				1	.499**	.392**	.518**
E-Service Quality					1	.642**	$.800^{**}$
E-Loyalty						1	.774**
E-Trust							1

From Table 8, it is found that the correlation coefficient (r) values for Security, Reliability, Ease of Use, Responsiveness, E-Loyalty, and E-Trust in relation to E-Service Quality are 0.694, 0.761, 0.667, 0.518, 0.800, and 0.774, respectively. These values indicate a strong positive relationship between the independent

Table 13

F square

Variables	F-square	Effect Size
Ease Of Use -> E-Service Quality	0.171	Medium

Reliability -> E-Service Quality	0.138	Medium
Responsiveness -> E-Service Quality	0.021	Small
Security -> E-Service Quality	0.025	Small
E-Service Quality -> E-Loyalty	0.32	Small
E-Service Quality -> E-Trust	1.816	Large
E-Trust -> E-Loyalty	0.575	Large

Table 13 shows the Model Fit Assessment, where we examined the goodness-of-fit indices for the model, specifically utilizing the Standardized Root Mean Square Residual (SRMR) as a key measure. The SRMR value is 0.072, which is below the threshold value of 0.08, indicating an acceptable model fit. Additionally, the Normed Fit Index (NFI) is 0.743, which is below the critical value of 0.90. Despite this, the model demonstrates good explanatory power, as suggested by Hu and Bentler (1998).

For the variable E-Service Quality, the fsquare values indicate varying effect sizes. Security (0.025) and Responsiveness (0.021) exhibit a small effect size, while E-Loyalty (0.32) also shows a small effect size on E-Service Quality. Ease of Use (0.171) and Reliability (0.138) demonstrate a medium effect size, whereas E-Trust (1.816) has a large effect size on E-Service Quality, as per Cohen (1988). These findings suggest that E-Trust plays a dominant role in influencing E-Service Quality, while other factors contribute at varying levels of significance.

Table 14

Regression

Variables	R-square	R_square adjusted
E-loyalty	0.637	0.635
E-service quality	0.654	0.650
E-trust	0.645	0.644

Table 14 shows that the R-square values indicate how well the independent variables explain the variability of the dependent variables. The model explains 63.7% of the variation in E-Loyalty ($R^2 = 0.637$, Adjusted $R^2 = 0.635$), 65.4% of the variation in E-

Figure 2

Path diagram

Service Quality ($R^2 = 0.654$, Adjusted $R^2 = 0.650$), and 64.5% of the variation in E-Trust ($R^2 = 0.645$, Adjusted $R^2 = 0.644$). Since all R-square values are above 0.60, the model demonstrates good explanatory power.



Figure 2 path diagram represents a structural modeling (SEM) equation framework, illustrating the relationships between latent variables (depicted as blue circles) and their observed indicators (yellow boxes). Each latent variable, such as "ESEQ," "RL," "E," and "ET," is measured through its corresponding observed variables (e.g., RL1, RL2, S1, S2). The numerical values within the blue circles likely indicate the explained variance (R-squared) for each latent variable, showcasing how well the model for their variance. Arrows between constructs

Table 15

Structura	l Mode	el Assessment
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represent hypothesized causal paths, with coefficients and p-values labeled along the arrows (e.g., 0.114 (0.056)), indicating the strength and statistical significance of the relationships. Some paths show strong and significant relationships, while others appear weak or insignificant, as indicated by "NaN" or high p-values. Overall, the diagram illustrates the interplay of variables and the effectiveness of the measurement and structural model components in explaining the observed data.

				1	Р		
Hypothesis	β	Mean	STDEV	statistics	values	Decision	
H1: Ease Of Use -> E-Service							
Quality	0.378	0.376	0.052	7.28	0	Accepted	
H2: Reliability -> E-Service							
Quality	0.361	0.361	0.063	5.714	0	Accepted	
H3: Responsiveness -> E-							
Service Quality	0.071	0.072	0.047	1.506	0.132	Rejected	

H4: Security -> E-Service						
Quality	0.114	0.115	0.059	1.911	0.056	Rejected
H5: E-Service Quality -> E-						
Loyalty	0.039	0.038	0.063	0.629	0.53	Rejected

Figure 2 and Table 15 present the bootstrapping results based 384 on subsamples and the corresponding hypothesis decisions. Among all hypotheses, H1 and H2 are accepted at the 0.05 significance level, indicating a positive and significant impact of Ease of Use and Reliability on the E-Service Quality e-commerce organizations. of However, H3, H4, and H5 are rejected, suggesting that Responsiveness and Security

do not have a significant effect on E-Service Quality, and E-Service Quality does not significantly impact E-Loyalty. These findings highlight that while Ease of Use and Reliability play crucial roles in enhancing E-Service Quality, other factors such as Responsiveness, Security, and E-Service Quality's influence on E-Loyalty do not exhibit statistically significant effects.

Table 16

Hypothesis (Mediating Effects)

Variables	Original sample	Sample mean	(STDE	T	P	Decision
H6: E-Service Quality -> E-	(0)	(141)	v)	statistics	values	Accepte
Trust -> E-Loyalty	0.615	0.617	0.048	12.798	0	d

Table 16 indicates the bootstrapping results and the decision relating to the hypothesis with mediating effects. The results indicate E- trust mediates the relationship between eservice quality and e-loyalty in the electronic commerce companies. Thus, H6 is accepted.

Figure 3

IPMA Мар



Table 17

Importance-Performance Map Analysis (IPMA)

Variables	Importance	Performance
Ease of Use	0.378	62.034
Reliability	0.361	78.699
Responsiveness	0.071	63.339
Security	0.114	65.93
Mean value	0.231	67.5005
E-service quality	-	72.786

Table 17 shows the Importance-Performance Map Analysis (IPMA), which highlights the significance and performance of key variables in influencing E-Service Quality. Ease of Use has the highest importance (0.378) but relatively lower performance (62.034), indicating a need for improvement. Reliability is also highly important (0.361) and performs well (78.699), suggesting its strong role in enhancing service quality. Responsiveness has a low importance score (0.071) and

VI. DISCUSSION

The present study finds that Ease of Use and Reliability have a significant positive impact on E-Service Quality in e-commerce moderate performance (63.339), while Security has a slightly higher importance (0.114) with a performance score of 65.93. The mean performance score across all variables is 67.5005, whereas E-Service Quality has an overall performance of 72.786. These findings suggest that focusing on improving Ease of Use and Reliability can have the most significant impact on enhancing E-Service Quality.

organizations, whereas Responsiveness and Security do not. Additionally, E-Service Quality does not significantly impact E- Loyalty, but E-Trust mediates this relationship. These findings are compared with past studies to evaluate their consistency.

Ease of Use and E-Service Quality

The finding that Ease of Use significantly impacts E-Service Quality aligns with the study by Alsamydai (2020), which found that user-friendly interfaces and easy navigation enhance customers' perceptions of e-service quality. Similarly, Rita et al. (2019) reported that ease of use plays a crucial role in shaping customers' online experiences. Since both past studies support this finding, the present result is consistent with prior research.

Reliability and E-Service Quality

The significant impact of Reliability on E-Service Quality is consistent with the findings of Zeithaml et al. (2002), who emphasized that customers associate reliable service with high-quality online experiences. Additionally, Parasuraman et al. (2005) found that reliability is a critical determinant of service quality in digital platforms. Given the alignment with these previous studies, the current findings are consistent with past research.

Responsiveness and E-Service Quality

The study finds that Responsiveness does not significantly impact E-Service Quality, which contradicts the findings of Santos (2003), who suggested that responsiveness is a key factor in e-service quality evaluation. However, Ho and Lee (2007) found that responsiveness had a weaker influence on e-service quality compared to other factors like reliability and ease of use. Thus, while the present study

VI. CONCLUSION AND IMPLICATION

Conclusion

It is found that Ease of Use and Reliability are the major predictors of E-Service Quality, contradicts some past research, it is partially consistent with studies that suggest a weaker role of responsiveness.

Security and E-Service Quality

The non-significant effect of Security on E-Ouality inconsistent Service is with Wolfinbarger and Gilly (2003),who emphasized that online security directly influences customers' perception of service quality. However, Kassim and Asiah Abdullah (2010) found that security concerns have diminished as e-commerce platforms have improved their cybersecurity measures. This suggests that while security was a major concern in the past, its influence on service quality may have weakened, making the present study partially consistent with recent research.

E-Service Quality and E-Loyalty

The study finds that E-Service Quality does not significantly impact E-Loyalty, which contradicts Cristobal et al. (2007), who found a strong link between service quality and loyalty in online settings. However, Zhou et al. (2019) suggested that trust plays a more significant role in fostering e-loyalty than service quality alone. Since the present study confirms that E-Trust mediates the relationship between E-Service Quality and E-Loyalty, this finding is partially consistent with past studies that highlight the importance of trust.

highlighting their importance in shaping customer perceptions in e-commerce.

Additionally, E-Trust plays a significant mediating role in the relationship between E-Service Quality and E-Customer Loyalty, indicating that trust is a key factor in retaining online customers.

Thus, it is concluded that improving Ease of Use and Reliability can significantly enhance E-Service Quality, leading to better user experiences. However, factors such as Responsiveness and Security do not have a direct impact on E-Service Quality,

Implications

The findings have important implications for e-commerce businesses. Enhancing Ease of Use and Reliability should be a priority, as improving website navigation, user-friendly interfaces, and dependable service can significantly enhance E-Service Quality. Additionally, Building E-Trust is crucial, as it mediates the relationship between E-Service Quality and E-Loyalty. Businesses should transparent focus on policies, secure transactions, and consistent service to gain customer confidence and encourage repeat purchases.

Furthermore, Reevaluating Responsiveness and Security is necessary since these factors

VII. Reference

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suggesting that customers may prioritize seamless interactions and consistent service over immediate responses and security concerns. Furthermore, since E-Service Quality alone does not directly influence E-Loyalty, building E-Trust is crucial for fostering long-term customer relationships. These findings provide valuable insights for ecommerce businesses to focus on service design strategies that enhance usability, reliability, and trust.

do not directly impact E-Service Quality. Instead of over-investing in these areas, businesses allocate should resources effectively, prioritizing factors like reliability and ease of use that have a stronger influence. Lastly, Fostering Customer Loyalty requires more than just high E-Service Quality; companies must build trust through personalized experience and responsive customer support. By focusing on these areas, e-commerce platforms can improve user satisfaction. strengthen customer relationships, and achieve long-term success.

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