Consumer Trust and Satisfaction in E-Commerce: Examining the Role of AI-Powered Chatbots and Virtual Assistants from a Security Perspective in Vellore District

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***Abstract*— The use of artificial intelligence in e-commerce has significantly changed the way customer services are offered, especially with the help of AI-based chatbots and virtual assistants. These technologies are increasingly becoming the main gateway between consumers and online platforms. Although they have been used for their efficiency and scalability, their success is also dependent on consumer perceptions of security, credibility, and reliability. This paper discusses the effect of AI-based conversational agents on consumer trust and satisfaction, with perceived security being a major determinant. The proposed framework indicates that the accuracy, responsiveness, clarity, personalization, and transparency of chatbot interaction quality are direct determinants of perceived security. Perceived security is the mediator between system performance and consumer trust. Increased levels of trust will, in turn, improve consumer satisfaction and engagement with the platform. Lack of clear communication or perceived weaknesses will, on the other hand, reduce trust and usage intentions. The paper indicates that trust in AI technology is not automatically created by technological development.**

***Index Terms*— AI-powered chatbots, virtual assistants, consumer trust, consumer satisfaction, perceived security, e-commerce, automated service interaction.**

I. INTRODUCTION

The increasing popularity of e-commerce in India has brought about a significant change in the way customer services are delivered through the adoption of artificial intelligence (AI). In areas like Vellore District, chatbots and virtual assistants powered by AI have become the main interface for customer inquiries and transaction services. These interfaces are more efficient and available, but their success depends on consumers' perceptions of security, reliability, and trustworthiness. AI-powered interactions need to have access to consumers' personal and financial information, which is a concern for privacy, security, and transparency. This is particularly important in Vellore District, where the adoption of digital technology is increasing with varying levels of digital literacy. The lack of human interaction in the interface increases the dependence on perceived security as a factor in judging AI-powered services. Current research focuses on usability and personalization but lacks insight into the trust-building process in AI-powered service interactions. Trust in AI technology is not an automatic consequence of technological sophistication. Perceived security is a critical mediator that links AI interaction quality and consumer trust and satisfaction. This research focuses on these issues in the context of AI-powered chatbots and virtual assistants in Vellore District.

II. REVIEW OF LITERATURE

The increasing use of artificial intelligence (AI)powered chatbots and virtual assistants has significantly altered customer service delivery in e-commerce. Prior studies indicate that these systems influence consumer behaviour primarily through interaction quality and perceived system reliability (Cheng et al., 2024). Chatbots are no longer evaluated only on efficiency but on how convincingly they

replicate dependable and secure service experiences in online environments.

Research consistently shows that chatbot interaction quality measured through accuracy, responsiveness, clarity, personalization, and transparency positively influences consumer trust and satisfaction (Gao et al., 2025; Tariq et al., 2023). High-quality interactions reduce uncertainty and improve users' confidence in automated systems, while inconsistent responses or system errors negatively affect attitudes toward chatbot usage (Syafitri & Alfansi, 2023). These findings suggest that service quality remains a foundational driver of positive consumer responses in AI-mediated interactions.

Trust has emerged as a critical outcome variable in chatbot-related studies. Unlike trust in human agents, trust in AI systems is strongly associated with perceptions of system reliability, predictability, and transparency (Leschanowsky et al., 2024). Empirical evidence confirms that trust mediates the relationship between chatbot service quality and consumer satisfaction, as well as continued usage intention (Gao et al., 2025).

Recent literature highlights perceived security and privacy risk as central concerns in AI-enabled service encounters. Studies reveal that users often conflate security, privacy, and trust when evaluating conversational agents, particularly in e-commerce transactions involving personal and financial data (Yang et al., 2023). Perceived risk has been shown to negatively affect trust and adoption intentions, while strong security assurance enhances acceptance (Marjerison et al., 2025). However, many studies treat perceived security as an independent predictor rather than examining its mediating role.

Systematic reviews emphasize the need for integrative frameworks that explain how technological attributes translate into trust and satisfaction through psychological mechanisms such as perceived security (Leschanowsky et al., 2024; Telematics and Informatics, 2025). Despite growing interest, limited empirical research has examined perceived security as a mediating variable in district-level or emerging market contexts. Addressing this gap, the present study positions perceived security as a central mechanism linking AI chatbot interaction quality with consumer trust and satisfaction in e-commerce.

Problem Definition

Despite the growing application of AI-powered chatbots and virtual assistants in the e-commerce sector, the problem of consumer trust and satisfaction with automated service interactions is still inconsistent. The existing literature is mainly focused on usability and personalization issues, without taking into account the significance of perceived security. The problems of data privacy, security, and transparency still affect the users' intention to use AI-powered services. Moreover, there is a lack of empirical studies on the mediating role of perceived security between the service interaction quality of chatbot service and consumer trust, especially at the district level. This is especially important for understanding the significance of AI-powered customer services in building trust and satisfaction with e-commerce platforms in the vellore district.

Objective Of the Study

- To examine the impact of AI-powered chatbots and virtual assistants on consumer trust in e-commerce platforms in Vellore district.
- To analyze the impact of AI-powered chatbots and virtual assistants on consumer satisfaction in e-commerce platforms in Vellore district.
- To assess the role of perceived security in influencing consumer trust and satisfaction toward AI-enabled chatbots and virtual assistants in e-commerce.

Hypothesis

$H1_1$ There is a significant relationship between AI-powered chatbot quality and consumer satisfaction in e-commerce.

$H1_2$ AI-powered chatbot quality has a significant impact on consumer satisfaction in e-commerce.

Theoretical Framework

Trust Theory (Morgan & Hunt, 1994) supports this study by explaining how trust influences positive consumer outcomes in digital environments. In AI-powered chatbots and virtual assistants, trust is built through perceptions of security, privacy, and system reliability. When consumers feel confident that their data is protected, perceived risk is reduced. This increased trust encourages continued interaction with e-commerce platforms. As a result, higher consumer trust directly leads to greater consumer satisfaction.

III. RESEARCH DESIGN

The present study adopts a quantitative research design to examine the relationship between consumer trust and consumer satisfaction in the context of AI-powered chatbots and virtual assistants in e-commerce platforms. The target population consists of e-commerce platform users in Vellore district who have experience interacting with AI-enabled chatbots or virtual assistants. A sample size of 150 respondents was selected using the snowball sampling technique, which was considered appropriate due to the absence of a comprehensive sampling frame for AI chatbot users. Data were collected through a structured questionnaire, and the responses were analyzed using descriptive statistics to summarize respondent characteristics and variable distributions. The reliability analysis indicates strong internal consistency for all study constructs. AI Chatbot Quality show's good reliability (Cronbach's α = 0.841), while AI Perceived Security (α = 0.917) and AI Consumer Trust (α = 0.907) demonstrate excellent reliability. AI Consumer Satisfaction also exhibits high reliability (α = 0.879). All alpha values exceed the recommended threshold of 0.70, confirming that the five items used to measure each construct are consistent and reliable for further correlation and regression analysis. Further, Pearson correlation analysis was employed to examine the relationship between consumer trust and consumer satisfaction, while simple linear regression analysis was used to assess the impact of consumer trust on consumer satisfaction. This design enables empirical testing of the proposed hypotheses and supports objective, data-driven conclusions.

IV. ANALYSIS AND INTERPRETAION

Table 1: Demographic profile of respondents

Demographic Variable	Category	Frequency	Percentage
Gender	Male	45	30
	FEMALE	150	70
	TOTAL	N=150	100
Age Group (In Year)	Below 20	15	10
	21-30	35	23.5
	31-40	75	50
	41-50	25	16.7
	TOTAL	150	100
Education Level	School	20	13.3
	UG	35	23.3
	PG	65	43.3
	DOCTROAL	25	16.7
	OTHERS	5	3.3
Occupation	Student	65	43.3
	PRIVATE EMPLOYEE	50	33.3
	OTHERS	30	20
	BUSINESS	5	3.3
Frequency Of Online Shopping	Weekly	25	16.7
	MONTHLY	75	50
	OCCASIONALLY	50	33.3

The demographic analysis reveals that the sample is predominantly female (70%), indicating higher participation of women in the study, while males constitute 30% of the respondents. The age distribution shows that half of the respondents (50%) fall within the 31–40 years age group, followed by those aged 21–30 years (23.3%), suggesting that the study largely represents individuals in their economically active and digitally engaged stages of life. Respondents below 20 years account for 10%, while 16.7% belong to the 41–50 age group.In terms of educational attainment, the majority of respondents possess postgraduate qualifications (43.3%), followed by undergraduates (23.3%) and doctoral degree holders (16.7%), indicating a relatively well-educated sample. This educational profile suggests a higher likelihood of informed perceptions regarding online shopping and technology use. Regarding occupation, students (43.3%) form the largest group, followed by private sector employees (33.3%), reflecting a sample with frequent exposure to digital platforms and e-commerce environments. With respect to online shopping behavior, monthly online shoppers constitute the largest segment (50%), while 33.3% shop occasionally and 16.7% shop weekly. This pattern indicates moderate yet consistent engagement with online shopping platforms, making the sample suitable for examining consumer perceptions related to e-commerce usage.

Table 2: Descriptive Statistics- Statement to assess AI chatbot quality and consumer satisfaction

Statement	mean	Standard deviation
The chatbot gives clear and relevant responses.	3.43	1.120
The chatbot responds quickly to my queries.	3.70	.903
The chatbot is easy to interact with.	3.60	.990
The chatbot provides helpful guidance during shopping	3.13	1.180
The chatbot handles my requests efficiently.	3.43	1.026
Statement	Mean	Standard deviation
I am satisfied with my shopping experience here	3.72	.770
The platform meets my expectations.	3.77	.839
I am happy with the assistance provided by the chatbot.	3.75	.955
My overall shopping experience is positive.	3.82	.820
I would continue using this platform due to my satisfaction.	3.75	.989

The descriptive statistics show that respondents generally expressed moderate to high agreement with the study statements. For AI Chatbot Quality items (CQ1–CQ5), mean scores range from 3.13 to 3.70 on a five-point scale, indicating an overall moderately positive perception, with CQ2 recording the highest mean (M = 3.70). The standard deviations (0.903–1.180) suggest moderate variability, meaning responses are reasonably consistent but not uniform. For Consumer Satisfaction items (CS1–CS5), mean values are relatively higher, ranging from 3.72 to 3.82, reflecting higher satisfaction levels among users. The lower standard deviations (0.770–0.989) indicate greater response consistency compared to chatbot quality items. Overall, the descriptive results suggest that while respondents perceive AI chatbots positively, consumer satisfaction levels are comparatively stronger and more stable.

Table 3: Variables In Correlation Analysis: Ai-Chatbot Quality and Consumer Satisfaction.

Correlations

		CQMEAN	CSMEAN
CQMEAN	Pearson Correlation	1	.576**
	Sig. (2-tailed)		.000
	N	150	150
CSMEAN	Pearson Correlation	.576**	1
	Sig. (2-tailed)	.000	
	N	150	150

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis reveals a moderate and positive relationship between consumer trust (CQMEAN) and consumer satisfaction (CSMEAN), with a Pearson correlation coefficient of r = 0.576. This indicates that as consumer trust in AI-powered chatbots and virtual assistants increases, consumer satisfaction also tends to increase. The relationship is found to be statistically significant at the 0.01 level (p = <0.001), suggesting that the observed association is not due to chance.The result provides strong empirical support for a meaningful association between the two variables. Therefore, the null hypothesis of no relationship between consumer trust and consumer satisfaction is rejected, confirming that trust plays an important role in shaping satisfaction in e-commerce platforms.

Table. 4: Variables In Linear Regression Analysis- Ai-Chatbot Quality on Consumer Satisfaction:
R Square value: .332
F value: 73.472
P value: <0 .001

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.005	.211		9.521	.000
	CQMEAN	.508	.059	.576	8.572	.000

a. Dependent Variable: CSMEAN

Regression analysis examined the effect of AI Chatbot Quality (CQMEAN) on Consumer Satisfaction (CSMEAN). The model is statistically significant (F = 73.474, p < .001), indicating that AI Chatbot Quality is a meaningful predictor of Consumer Satisfaction. The correlation coefficient (R = 0.576) shows a moderate positive relationship between the variables. The coefficient of determination (R^2 = 0.332) reveals that 33.2% of the variance in consumer satisfaction is

explained by AI chatbot quality, which is substantial for behavioral research.

The regression coefficient for AI Chatbot Quality is positive and significant ($\beta = 0.576$, $B = 0.508$, $t = 8.572$, $p < .001$), indicating that an increase in chatbot quality leads to a significant increase in consumer satisfaction. Specifically, a one-unit increase in AI chatbot quality results in a 0.508 unit increase in consumer satisfaction. Therefore, the hypothesis that AI chatbot quality significantly influences consumer satisfaction is supported.

V. CONCLUSION

Based on the findings of this research, it can be concluded that the quality of AI chatbots has a significant and meaningful impact on consumer satisfaction in e-commerce websites. The descriptive analysis shows that consumers have a positive perception of AI chatbots, and the reliability analysis shows that all the constructs used in this study are reliable and consistent. The regression analysis shows that the quality of AI chatbots has a moderate positive impact on consumer satisfaction, which explains 33.2% of the variation, and this shows that the quality of AI chatbots is an important but not the only factor in determining consumer satisfaction. Although the statistical significance shows that AI chatbots are important in improving consumer satisfaction, the variation not explained by the model shows that other factors, such as trust and security, also have an impact on consumer satisfaction.

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