

Real-Time Delivery Tracking and Its Influence on Customer Trust and Retention Intentions in Indian E-Commerce: Evidence from Bangalore

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Abstract—Background: The acceleration of digital commerce has transformed consumer expectations in last-mile logistics, elevating real-time delivery visibility from a value-added feature to a strategic service differentiator. Despite growing global adoption of real-time delivery tracking (RTDT) systems, empirical research examining their granular influence on customer trust and retention intentions in India's urban e-commerce context remains limited. **Research Gap:** Prior studies have examined delivery transparency broadly, without disaggregating its effects on trust and retention as distinct constructs, or without situating findings within India's demographically complex e-commerce landscape. **Objective:** This study investigates how real-time delivery tracking features influence customer trust and retention intentions among online shoppers in Bangalore, Karnataka. **Methodology:** A descriptive, cross-sectional survey design was employed using a structured questionnaire administered via Google Forms. The final analytical sample comprised 275 respondents who confirmed direct experience with real-time tracking features on e-commerce platforms. Constructs were operationalized through validated multi-item Likert scales. **Statistical Techniques:** One-sample t-tests, Pearson correlation analysis, simple linear regression, one-way ANOVA, and independent-samples t-tests were applied. Internal consistency was confirmed through Cronbach's alpha. **Major Findings:** Real-Time Delivery Visibility (RTDV) was rated highly ($M = 4.547/5.00, \alpha = 0.902$). Customer trust ($M = 4.030$) and retention intentions ($M = 4.015$) were significantly above the neutral midpoint ($t = 13.329$ and $t = 13.276$, respectively; $p < .001$). RTDV significantly predicted customer trust ($r = 0.420, R^2 = 17.6\%, p < .001$). A very strong trust-retention association was found ($r = 0.886, p < .001$). Age-based differences in trust were significant ($F = 3.253, p = .013$); gender differences were not. **Contributions:** The study integrates TAM and Commitment-Trust Theory to explain how technological visibility features translate into relational consumer outcomes. **Practical Implications:** E-commerce platforms should invest strategically in accurate, transparent, and age-responsive tracking interfaces to build durable customer relationships.

Keywords—customer trust; delivery visibility; e-commerce logistics; India; last-mile delivery; real-time delivery tracking; retention intentions; technology acceptance.

I. INTRODUCTION

The digital transformation of retail has fundamentally altered the consumer experience, shifting competitive dynamics from product assortment to end-to-end service quality. E-commerce in India, valued at approximately USD 83 billion in 2023 and projected to reach USD 350 billion by 2030 (IBEF, 2023), represents one of the fastest-growing digital markets globally. Within this landscape, last-mile delivery — the final segment of the supply chain connecting fulfilment centres to consumers — has emerged as both a primary source of competitive differentiation and a principal driver of customer satisfaction and loyalty.

Unlike the in-store retail experience, where the act of purchasing and the receipt of goods are simultaneous, online shopping introduces an interval of uncertainty between the placement and receipt of an order. This temporal gap, which may span hours to several days, generates anxiety, uncertainty, and diminished trust if customers lack visibility into the status of their orders. The psychological burden of this uncertainty is not trivial: research by Duong, Nguyen, and Pham (2025) has established that the absence or inaccuracy of delivery tracking information significantly elevates consumer anxiety and erodes platform trust. Real-time delivery tracking systems — encompassing order status updates, GPS-enabled live courier tracking, estimated time of arrival (ETA) notifications, and delay alerts — address this uncertainty by providing customers with continuous, transparent delivery intelligence.

Bangalore, Karnataka's capital and India's technology hub, is a particularly relevant research context. The city hosts the highest concentration of technology-literate, internet-connected urban consumers in India, making it an ideal environment for studying the behavioural effects of digital service features. Amazon India, Flipkart, Meesho, and Myntra collectively serve millions of Bangalorean consumers, while quick-commerce platforms such as Blinkit, Swiggy Instamart, and Zepto have normalized ten-to-thirty-minute delivery windows underpinned by sophisticated real-time tracking infrastructure.

The theoretical significance of this intersection — between logistics technology, consumer psychology, and relational marketing — is well established. Trust is widely recognized as a foundational prerequisite for e-commerce adoption and repeat purchase behaviour (Kim, Ferrin, & Rao, 2008; Morgan & Hunt, 1994). Technology Acceptance Theory (Davis, 1989) provides a framework for understanding how the perceived usefulness and usability of tracking features shape consumer attitudes and behavioural intentions. The synthesis of these theoretical lenses creates a powerful explanatory framework for the phenomena under investigation.

Despite the practitioner significance of delivery tracking and the theoretical richness of the trust-retention nexus, empirical research addressing the granular, construct-level impact of real-time delivery visibility on customer trust and retention intentions within the Indian urban e-commerce context is notably sparse. Most existing studies examine tracking as part of broader service quality dimensions without isolating its specific psychological and behavioural effects. This study addresses this gap directly.

A. Research Problem

The central research problem motivating this study is as follows: to what extent do real-time delivery tracking features on Indian e-commerce platforms influence customer trust and retention intentions, and do these effects vary by demographic characteristics?

B. Research Objectives

The study pursues four specific research objectives:

- To examine the effect of real-time delivery tracking features on customer trust among e-commerce users in Bangalore.
- To investigate the relationship between real-time delivery visibility and customer retention intentions.
- To assess the predictive power of tracking accuracy on customer trust.
- To test whether customer trust and retention intentions differ significantly across demographic groups (age and gender).

C. Contributions of the Study

This study makes three principal contributions. Theoretically, it integrates the Technology Acceptance Model with the Commitment-Trust Theory to explain how logistical transparency translates into relational consumer outcomes — an integration not previously tested in the Indian e-commerce context.

Empirically, it provides construct-level evidence, from a sample of 275 urban Indian e-commerce users, establishing that real-time delivery visibility is a significant predictor of trust and that trust is a very strong predictor of retention intentions.

Managerially, the study provides actionable evidence for e-commerce platform managers, logistics service providers, and public policy makers in India regarding the strategic importance of delivery tracking investment.

II. LITERATURE REVIEW

A. Last-Mile Delivery Research

Last-mile delivery has attracted increasing scholarly attention as e-commerce growth has intensified the complexity and cost of final-segment fulfilment. Vrhovac, Juric, and Pucihar (2024) demonstrated through structural equation modelling that delivery speed, reliability, and communication quality are the dominant determinants of last-mile delivery satisfaction. Nagadeepa, Selvi, and Pushpa (2024) established, through an India-based analysis, that real-time parcel monitoring constitutes the most impactful innovation in last-mile logistics; customers with positive live-tracking experiences exhibited significantly higher satisfaction rates (78%) compared to those without tracking access (49%). Sianturi and Novebri (2025), studying Indonesian online consumers, found that both service quality and technology convenience independently contribute to delivery satisfaction, with technology convenience effects becoming increasingly dominant as mobile usage intensifies.

A notable gap in the last-mile delivery literature is the insufficient disaggregation of delivery tracking as a distinct service quality dimension. Most studies subsume tracking within broader communication or information quality constructs, obscuring the specific mechanisms by which tracking visibility influences consumer psychology.

B. Urban Logistics Systems

Urban logistics presents unique challenges related to traffic density, infrastructural constraints, and consumer density. Tsang, Choy, Wu, and Ho (2021) demonstrated that integrating IoT-enabled delivery planning with real-time positional data substantially improves last-mile efficiency in dense urban environments. In the Indian context, Dixith and Vinay (2025) found that digitalization of supply chains, including the deployment of tracking technologies, significantly enhanced customer satisfaction in urban e-commerce operations.

The rapid proliferation of quick-commerce operators (sub-thirty-minute delivery) in Indian metropolitan areas has created a new logistics paradigm in which real-time tracking is not merely a service feature but a fundamental operational requirement.

C. Two-Wheeler Logistics and Urban Delivery Networks

Two-wheeler delivery networks — characteristic of Indian urban logistics — present specific operational and tracking considerations distinct from vehicular freight systems.

The high manoeuvrability and relative affordability of two-wheeler delivery enable penetration of dense urban neighbourhoods inaccessible to larger vehicles. However, GPS tracking reliability, battery life constraints, and app interface design on two-wheelers require specific technological solutions. The intersection of electric two-wheeler logistics and real-time tracking presents an emerging research frontier with implications for sustainability and operational efficiency.

D. Technology Adoption in Logistics

Technology adoption in logistics contexts has been theorized through multiple frameworks. Davis's (1989) Technology Acceptance Model (TAM) posits that perceived usefulness and perceived ease of use are the primary determinants of technology adoption attitude and behavioural intention. In logistics, Fang (2025) established that the technical reliability of cloud-based real-time tracking systems is a critical determinant of tracking accuracy, which in turn influences customer trust. Bahashwan (2025) found that platforms with poor tracking infrastructure experienced customer churn rates twice as high as those with real-time systems, providing strong commercial evidence for the adoption imperative. Rahman and Dekkati (2022) traced the historical evolution of order tracking systems, demonstrating a trajectory from basic shipment confirmation emails toward GPS-enabled, app-integrated real-time visibility.

E. Customer Trust in E-Commerce

Trust in e-commerce has been extensively theorized and empirically examined. Kim, Ferrin, and Rao (2008) identified information quality, system quality, and service quality as the primary antecedents of e-commerce trust, with trust being the strongest predictor of purchase and repurchase intentions. Morgan and Hunt's (1994) commitment-trust theory established that trust and commitment are the key mediating variables in all successful relational exchanges.

Islam and Ahsan (2024), studying e-commerce trust in Bangladesh, identified delivery transparency as a stronger trust antecedent than price satisfaction or product variety, surpassed only by payment security. Duong, Nguyen, and Pham (2025) linked trust dynamics to tracking behaviour in live-streaming commerce, finding that uncertainty about delivery amplifies platform scepticism.

Emiliana and Efawati (2025) found that delivery transparency significantly enhances customer satisfaction in online marketplaces, with transparent delivery status updates generating higher trust scores. Hakim, Sari, and Putra (2024) added a design dimension, demonstrating that the interface quality of tracking systems independently predicts customer loyalty intention above and beyond tracking functionality. Marbun, Lestari, and Hidayat (2024) showed that communication quality — including clarity, frequency, and accuracy of delivery updates — is a primary driver of perceived delivery quality on Shopee, a major Southeast Asian platform.

F. Retention Intentions and Loyalty

Customer retention and loyalty have been theorized as consequences of trust and satisfaction. Oliver (1999) established the cognitive-affective-conative model of loyalty, in which trust and positive service experiences drive conative loyalty intentions. Zeithaml, Berry, and Parasuraman (1996) demonstrated that service quality directly influences behavioural intentions including willingness to recommend, repurchase, and loyalty. Ngo, Tran, and Le (2025) found that logistics service quality is a significant predictor of repurchase satisfaction and recommendation intention among Generation Z consumers. The trust-to-retention pathway is particularly important in e-commerce given the low switching costs and high platform substitutability characterizing the Indian market.

G. Sustainability and Electric Mobility in Logistics

An emerging strand of logistics research examines the intersection of delivery tracking with sustainability. Real-time tracking enables failed-delivery prediction and route optimization, reducing carbon emissions and fuel consumption. The Government of India's push toward electric vehicle adoption in logistics — including subsidies under the FAME II scheme — makes the integration of EV tracking with customer-facing delivery visibility systems an important area of both academic and policy inquiry. Birigozzi, Calabrese, and Gastaldi (2025) noted that digital infrastructure investment in emerging economies drives consumption growth with attendant sustainability considerations that require careful policy management.

H. Identification of Research Gap

The foregoing literature review reveals a clear and specific research gap: while extant studies have explored delivery transparency as a component of service quality (Emiliana & Efawati, 2025; Marbun et al., 2024), and while trust has been studied as an e-commerce outcome (Kim et al., 2008; Islam & Ahsan, 2024), no study has simultaneously and distinctly examined how real-time delivery visibility — as an operationalized, multi-item construct — predicts customer trust and retention intentions in the Indian urban e-commerce context, while also testing demographic moderation. This study fills that gap with a Bangalore-based quantitative investigation.

III. THEORETICAL FRAMEWORK

A. Selected Frameworks and Justification

This study integrates two complementary theoretical frameworks: the Technology Acceptance Model (TAM) and the Commitment-Trust Theory of Relationship Marketing.

TAM (Davis, 1989) posits that users' perceived usefulness (PU) and perceived ease of use (PEOU) of a technology determine their attitude toward using it, which in turn predicts behavioural intention. In the context of real-time delivery tracking, the tracking interface's PU (does it provide accurate, useful delivery information?) and PEOU (is it easy to read and interpret?) determine consumers' positive attitude toward the platform, which translates into trust and retention intention. TAM is particularly appropriate here because the study measures attitudinal responses to a specific technology feature — real-time delivery visibility — rather than a general platform evaluation.

The Commitment-Trust Theory (Morgan & Hunt, 1994) provides the relational marketing lens. It proposes that trust — the belief that a relational partner is reliable and has integrity — is the central mediating variable between antecedent conditions (such as communication quality and shared values) and cooperative outcomes (such as loyalty and retention). In e-commerce, trust built through transparent, accurate delivery tracking generates the relational commitment that drives retention intentions. The theory explains the empirically observed strong correlation between customer trust and retention intentions ($r = 0.886$ in this study).

B. Conceptual Model

Based on the integrated theoretical framework, the conceptual model proposes the following relationships:

- Real-Time Delivery Visibility (RTDV) positively influences Customer Trust (CT), consistent with TAM's perceived usefulness pathway.

- Tracking Accuracy — a key dimension of RTDV — significantly moderates the strength of the RTDV-to-CT relationship.
- Customer Trust (CT) strongly predicts Retention Intentions (RI), consistent with the Commitment-Trust Theory.
- Demographic variables (age, gender) moderate the RTDV-to-CT relationship.

The integrated framework advances prior research by providing a theoretically grounded, multi-level explanation of how a specific logistics technology feature — real-time delivery tracking — operates through psychological trust mechanisms to produce commercially significant retention outcomes.

IV. RESEARCH METHODOLOGY

A. Research Design

This study employs a quantitative, descriptive, and cross-sectional research design. The descriptive design is appropriate given the study's aim to characterize the nature and strength of relationships between real-time delivery tracking features, customer trust, and retention intentions in a defined population of urban e-commerce users. Cross-sectional data collection enables snapshot-in-time measurement of attitudinal and behavioural constructs across a demographically diverse sample.

B. Data Collection Instrument

Data were collected through a structured, self-administered online questionnaire deployed via Google Forms. The questionnaire comprised four sections. Section 1 contained a screening question to ensure that only respondents with personal experience of real-time delivery tracking on e-commerce platforms were included in the primary analysis, yielding the 275-respondent subsample used for hypothesis testing. Section 2 captured demographic information including age group, gender, online shopping frequency, preferred platform, and average monthly online expenditure. Section 3 measured the Real-Time Delivery Visibility (RTDV) construct using six items operationalizing order status transparency, uncertainty reduction, tracking accuracy, notification timeliness, logistics management efficiency, and accountability signalling, each scored on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Section 4 measured Customer Trust (CT) and Retention Intentions (RI) using five items each, similarly scaled. Scale items were adapted from established instruments in the e-commerce trust (Kim et al., 2008) and service quality (Zeithaml et al., 1996) literatures.

C. Sampling and Sample Size

Convenience sampling was employed to recruit respondents from the urban consumer population of Bangalore, Karnataka. While convenience sampling introduces limitations regarding external generalizability, it is widely employed and accepted in exploratory quantitative research on consumer behaviour (Hair et al., 2010). The total sample yielded 307 responses, with 275 having complete data on all three construct scales following the screening filter. A sample size of 275 surpasses the minimum recommended threshold of 200 for multivariate analysis (Hair et al., 2010) and provides sufficient statistical power (> 0.80) for the regression and correlation analyses employed.

D. Reliability and Validity

Internal consistency reliability was assessed using Cronbach's alpha for each construct. All three constructs exceeded the threshold of 0.70 recommended by George and Mallery (2003), with RTDV achieving $\alpha = 0.902$, Customer Trust $\alpha = 0.972$, and Retention Intentions $\alpha = 0.966$, all classified as excellent. Content validity was established through a systematic review of the extant literature prior to instrument design. Convergent validity is indirectly supported by the high mean scores (all well above the neutral midpoint) and the strong inter-construct correlations aligned

with theoretical predictions. Future studies should employ confirmatory factor analysis (CFA) to formally establish convergent and discriminant validity.

E. Statistical Analysis Techniques

Analyses were conducted using Python (version 3.x) with the pandas, numpy, and scipy libraries. Descriptive statistics (means, standard deviations) were computed for all constructs and individual items. One-sample t-tests (test value = 3.0) were used to assess whether construct means were significantly above the neutral point. Pearson product-moment correlations assessed bivariate associations between constructs. Simple linear regressions identified the predictive power of RTDV on CT and RI. One-way ANOVA examined differences in trust across age groups. Independent-samples t-tests assessed gender-based differences in trust and retention intentions.

V. RESULTS

A. Demographic Profile of Respondents

A total of 307 responses were collected, with 275 providing complete data across all scale items. Tables I through V present the demographic profile of the full 307-responder sample.

TABLE I
AGE DISTRIBUTION OF RESPONDENTS (N = 307)

Age Group	Frequency	Percentage (%)
Below 20	1	0.3%
18–20	26	8.5%
21–25	116	37.8%
26–30	47	15.3%
31–40	36	11.7%
Above 40	49	16.0%
Not specified	32	10.4%
Total	307	100.0%

TABLE II
GENDER DISTRIBUTION OF RESPONDENTS (N = 307)

Gender	Frequency	Percentage (%)
Male	130	42.3%
Female	110	35.8%
Prefer not to say	35	11.4%
Not specified	32	10.4%
Total	307	100.0%

TABLE III
FREQUENCY OF ONLINE SHOPPING (N = 307)

Shopping Frequency	Frequency	Percentage (%)
Once a month	124	40.4%
2–3 times a month	85	27.7%
Weekly	44	14.3%
More than once a week	22	7.2%
Not specified	32	10.4%
Total	307	100.0%

TABLE IV
PREFERRED E-COMMERCE PLATFORM (N = 307)

Platform	Frequency	Percentage (%)
Amazon India	104	33.9%
Flipkart	82	26.7%
Meesho	42	13.7%
Myntra	29	9.4%
Other	18	5.9%
Not specified	32	10.4%
Total	307	100.0%

TABLE V
AVERAGE MONTHLY ONLINE SPENDING (N = 307)

Spending Range	Frequency	Percentage (%)
Below ₹2,000	150	48.9%
₹2,000–5,000	99	32.2%
₹5,001–10,000	21	6.8%
Above ₹10,000	5	1.6%
Not specified	32	10.4%
Total	307	100.0%

The sample is predominantly composed of young adults aged 21–25 (37.8%), consistent with the demographic profile of active e-commerce users in urban India. Amazon India (33.9%) and Flipkart (26.7%) are the most preferred platforms, collectively accounting for over 60% of respondents' primary platforms. The majority of respondents (48.9%) spend below INR 2,000 monthly on online

shopping, reflecting a predominantly mid-to-low-expenditure consumer base.

B. Descriptive Statistics and Reliability Analysis

Table VI presents construct-level summary statistics and Cronbach's alpha reliability coefficients for the 275-responder analytical sample.

TABLE VI
CONSTRUCT-LEVEL SUMMARY STATISTICS AND RELIABILITY (N = 275)

Construct	Items	N	Mean	SD	Cronbach α
Real-Time Delivery Visibility (RTDV)	6	275	4.547	0.606	0.902 (Excellent)
Customer Trust (CT)	5	275	4.030	1.281	0.972 (Excellent)
Retention Intentions (RI)	5	275	4.015	1.267	0.966 (Excellent)

All three constructs demonstrate excellent internal consistency, with Cronbach's alpha values substantially exceeding the 0.70 threshold (Hair et al., 2010). The highest construct mean was recorded for RTDV ($M = 4.547$, $SD = 0.606$), indicating near-unanimous positive evaluation of real-time delivery tracking features by experienced users. Customer Trust ($M = 4.030$) and Retention Intentions ($M = 4.015$) were both rated above the “agree” threshold and considerably above the neutral midpoint of 3.0, indicating

strong positive attitudinal orientations toward platforms offering real-time tracking.

C. Item-Level Descriptive Statistics

Table VII presents item-level statistics for all 16 scale items across the three constructs. All RTDV items received mean scores above 4.50, with RTDV3 (“Accurate tracking enhances overall delivery experience”) recording the highest mean ($M = 4.582$), and all Customer Trust and Retention Intentions items received means between 3.967 and 4.055.

TABLE VII
ITEM-LEVEL DESCRIPTIVE STATISTICS (N = 275)

Code	Construct	Item Statement	N	Mean	SD
RTDV1	RTDV	Platforms offer greater transparency in delivery process	275	4.502	0.799
RTDV2	RTDV	Real-time updates reduce uncertainty about order arrival	275	4.535	0.731
RTDV3	RTDV	Accurate tracking enhances overall delivery experience	275	4.582	0.717
RTDV4	RTDV	Timely notifications improve confidence in logistics	275	4.560	0.729
RTDV5	RTDV	Visibility reflects efficient logistics management	275	4.542	0.760
RTDV6	RTDV	Live tracking demonstrates accountability in delivery	275	4.560	0.693
CT1	Customer Trust	Delivery visibility increases trust in e-commerce platforms	275	4.040	1.378
CT2	Customer Trust	Accurate tracking makes platform appear more reliable	275	4.015	1.351
CT3	Customer Trust	Transparent updates strengthen confidence in commitments	275	3.989	1.374
CT4	Customer Trust	Real-time tracking makes platforms more dependable	275	4.051	1.336
CT5	Customer Trust	Delivery visibility influences platform credibility	275	4.055	1.313
RI1	Retention Intentions	More likely to continue purchasing from tracking platforms	275	4.040	1.370
RI2	Retention Intentions	Real-time visibility increases repeat purchase intention	275	3.967	1.341
RI3	Retention Intentions	Prefer platforms that offer transparent tracking	275	3.982	1.379
RI4	Retention Intentions	Would recommend platforms with effective tracking	275	4.044	1.328
RI5	Retention Intentions	Tracking influences decision to remain loyal to platform	275	4.040	1.338

VI. HYPOTHESIS TESTING

A. Hypotheses

The following hypotheses, grounded in the theoretical framework, were tested:

- H_{01} : Real-time delivery tracking has no significant impact on customer trust. (H_{11} : There is a significant positive impact.)
- H_{02} : Real-time delivery tracking has no significant impact on retention intentions. (H_{12} : There is a significant positive impact.)

- H_{03} : Tracking accuracy does not significantly predict customer trust. (H_{13} : Tracking accuracy significantly predicts customer trust.)

B. One-Sample T-Tests: H_1 and H_2

One-sample t-tests were conducted against a neutral test value of 3.0 to assess whether customer trust and retention intentions were significantly elevated in the context of real-time delivery tracking. Results are presented in Table VIII.

TABLE VIII
ONE-SAMPLE T-TEST RESULTS (TEST VALUE = 3.0, N = 275)

Construct	N	Mean	SD	t-statistic	Decision
Customer Trust (CT)	275	4.030	1.281	13.329***	H_{01} Rejected
Retention Intentions (RI)	275	4.015	1.267	13.276***	H_{02} Rejected

Note: *** $p < .001$. 95% CI for CT: (3.878, 4.182); for RI: (3.865, 4.165).

The one-sample t-tests confirmed that both customer trust [$t(274) = 13.329, p < .001$] and retention intentions [$t(274) = 13.276, p < .001$] were significantly above the neutral midpoint in the presence of real-time delivery tracking. Null hypotheses H_{01} and H_{02} are rejected. These results support H_{11} and H_{12} , confirming that real-time delivery tracking has

a significant and positive impact on both customer trust and retention intentions.

C. Pearson Correlation and Simple Linear Regression: H_3

Table IX presents the inter-construct correlation matrix. Table X presents simple linear regression results for RTDV as a predictor of customer trust and retention intentions.

TABLE IX
INTER-CONSTRUCT CORRELATION MATRIX (N = 275)

Construct	RTDV	CT	RI
RTDV	1.000	0.420***	0.414***
Customer Trust (CT)	0.420***	1.000	0.886***
Retention Intentions (RI)	0.414***	0.886***	1.000

TABLE X
SIMPLE LINEAR REGRESSION — RTDV PREDICTING CT AND RI

Dependent Variable	β (Unstd.)	Std. Beta	R ²	F	p
Customer Trust (CT)	0.888	0.420	.176 (17.6%)	58.14	< .001
Retention Intentions (RI)	0.866	0.414	.171 (17.1%)	55.37	< .001

RTDV was a statistically significant positive predictor of both customer trust ($\beta = 0.888, R^2 = .176, p < .001$) and retention intentions ($\beta = 0.866, R^2 = .171, p < .001$). Hypothesis H_{03} is rejected, confirming H_{13} . Critically, the trust-to-retention correlation ($r = 0.886, p < .001$) is substantially larger than the RTDV-to-trust correlation ($r = 0.420$), consistent with the Commitment-Trust Theory's

proposition that trust is the primary relational driver of retention.

D. One-Way ANOVA: Age-Based Differences in Trust

Table XI presents ANOVA results examining whether trust scores differ significantly across age groups.

TABLE XI
ONE-WAY ANOVA — CUSTOMER TRUST BY AGE GROUP

Factor	F-statistic	df (Between)	df (Within)	p-value	Decision
Age Group	3.253	5	269	0.013*	Significant

TABLE XII
MEAN CUSTOMER TRUST SCORE BY AGE GROUP

Age Group	N	Mean Trust	SD	Relative Position
Below 20	1	3.000	—	Insufficient data
18–20	26	3.823	1.706	Below average
21–25	116	4.172	1.018	Above average
26–30	47	4.060	1.291	Above average
31–40	36	4.394	1.099	Highest trust
Above 40	49	3.527	1.562	Lowest trust

E. Gender Analysis

TABLE XIII
INDEPENDENT SAMPLES T-TEST — TRUST AND RETENTION BY GENDER

Variable	Male (n=130) M/SD	Female (n=110) M/SD	t / p-value
Customer Trust	3.923 / 1.306	3.927 / 1.261	t = -0.062, p = .951 (ns)
Retention Intentions	3.878 / 1.286	3.898 / 1.260	t = -0.118, p = .906 (ns)

Gender had no significant effect on either customer trust (p = .951) or retention intentions (p = .906). Male and female respondents exhibited virtually identical mean scores across

both constructs, indicating that the trust-building effects of real-time delivery tracking are gender-invariant.

F. Summary of Hypothesis Test Results

TABLE XIV
SUMMARY OF HYPOTHESIS TEST RESULTS

H	Hypothesis	Test Used	Result
H ₁	RTDT has no significant impact on customer trust	One-sample t-test	Rejected — t = 13.329, p < .001
H ₂	RTDT has no significant impact on retention intentions	One-sample t-test	Rejected — t = 13.276, p < .001
H ₃	Tracking accuracy does not significantly predict customer trust	Pearson r & Regression	Rejected — r = 0.420, β = 0.888, p < .001

VII. DISCUSSION

A. The Trust-Building Function of Real-Time Delivery Visibility

The finding that real-time delivery visibility generates significantly elevated customer trust (M = 4.030, t = 13.329, p < .001) carries important theoretical and practical significance. This result is consistent with the Technology Acceptance Model's proposition that perceived usefulness of a technology feature positively shapes user attitudes. Real-time tracking communicates to the customer that the platform has invested in reliable logistics infrastructure, that it is willing to share operational information transparently, and that it honours its delivery commitments — all dimensions of perceived usefulness that Morgan and Hunt (1994) would identify as trust antecedents.

The result aligns with and extends the findings of Islam and Ahsan (2024), who identified delivery transparency as a primary trust antecedent in the Bangladeshi e-commerce context, and of Emiliana and Efawati (2025), who demonstrated that transparent delivery status updates drive customer satisfaction in Southeast Asian online markets. The Bangalore finding contributes the additional value of an Indian urban e-commerce context where smartphone-enabled GPS tracking is now mainstream across major platforms. It also extends Nagadeepa et al.'s (2024) India-based finding that live tracking generates substantially higher customer satisfaction, now specifically linking this technology feature to trust as a distinct construct.

The tracking accuracy dimension (RTDV3: M = 4.582) emerged as the highest-rated item, suggesting that accuracy — not merely the presence of tracking — is what consumers value most. This has significant implications for platform managers: investing in accurate, reliable tracking infrastructure (rather than merely providing a tracking interface) is the primary lever for trust construction. Fang's (2025) work on cloud-based tracking architecture reliability is particularly germane here, as technical reliability underpins the accuracy that consumers reward with trust.

B. The Trust-Retention Nexus

The very strong correlation between customer trust and retention intentions (r = 0.886, p < .001) is the most consequential finding of this study. This relationship substantially exceeds the RTDV-to-trust correlation (r = 0.420), indicating that while delivery visibility initiates trust formation, it is trust — once formed — that powerfully drives long-term retention. This is precisely the mechanism theorized by Morgan and Hunt's (1994) Commitment-Trust Theory: trust acts as a relational mediator, converting positive service experience signals into durable commitment.

This finding has important commercial implications for Indian e-commerce. In a market characterized by low switching costs and intense platform competition, the ability to translate a service feature (real-time tracking) into relational commitment (trust and retention intention) represents a significant and sustainable competitive advantage.

Bahashwan's (2025) finding that platforms with poor tracking experience twice the customer churn rate provides the commercial counterpoint: the cost of not investing in tracking is measurable in customer attrition.

The regression result ($R^2 = 17.6\%$ of trust variance explained by RTDV) should be interpreted in context. Delivery tracking is one of several trust antecedents, alongside product quality, pricing, customer service, payment security, and return policy. The fact that a single logistics technology feature explains nearly a fifth of trust variance is a substantial and commercially significant finding. Ngo, Tran, and Le (2025) similarly found that logistics service quality was a primary satisfaction predictor for Generation Z consumers, and Zeithaml et al. (1996) established that behavioural consequences of service quality — including repurchase and recommendation — are directly linked to perceptions of reliability and responsiveness.

C. Age-Based Variation in Trust

The significant ANOVA result ($F = 3.253, p = .013$) reveals that trust in real-time delivery tracking varies meaningfully across age cohorts, adding nuance to the aggregate findings. The highest trust was found in the 31–40 age group ($M = 4.394$), consistent with the interpretation that these consumers, having accumulated substantial e-commerce experience, are better positioned to evaluate tracking system quality and more sensitive to its reliability. This group likely exercises deliberate judgment about platform trustworthiness based on tracking performance history.

The lowest trust scores were recorded for consumers above 40 ($M = 3.527$), a finding that aligns with broader digital technology adoption literature suggesting that older consumers may face greater interface complexity barriers, may have lower baseline digital trust, or may have had more negative tracking experiences due to device or connectivity limitations. This finding has direct managerial implications: platform designers should consider age-inclusive UX design for tracking interfaces, including simplified dashboards, larger fonts, and proactive SMS/call-based updates as alternatives to app-dependent tracking for older cohorts.

The below-average trust in the 18–20 cohort ($M = 3.823$) is also noteworthy. This younger group, while digitally fluent, may have higher expectations for tracking performance — informed by experiences with quick-commerce platforms offering real-time courier location updates — making them more critical evaluators of conventional e-commerce tracking systems.

D. Gender Invariance

The absence of significant gender differences in trust ($p = .951$) and retention intentions ($p = .906$) is a finding with clear managerial implications: the trust-building effects of real-time delivery tracking are equitably distributed across gender. This suggests that platform managers need not develop gender-differentiated tracking experiences and that a well-designed, universally accessible tracking system generates equivalent trust benefits for all users regardless of gender. This finding is consistent with broader e-commerce trust research that has generally found gender to be a weak moderator of technology-mediated trust formation (Kim et al., 2008).

VIII. THEORETICAL CONTRIBUTIONS

A. Contribution to E-Commerce Trust Theory

This study advances e-commerce trust theory by providing construct-level empirical evidence that real-time delivery visibility — a specific logistics technology feature — is a significant antecedent of customer trust.

Prior trust research has primarily examined broader antecedents such as website quality, brand reputation, and security mechanisms. By isolating real-time delivery visibility as a trust-building mechanism, this study enriches the granularity of e-commerce trust research and demonstrates that trust formation is an ongoing, experience-embedded process that extends beyond the purchase transaction into the fulfilment phase.

B. Integration of TAM and Commitment-Trust Theory

The study's theoretical integration of the Technology Acceptance Model and the Commitment-Trust Theory provides a novel framework for explaining how logistics technology features generate relational consumer outcomes. TAM accounts for the attitudinal reception of tracking technology (perceived usefulness → positive attitude); Commitment-Trust Theory explains the relational pathway from trust to retention commitment. This integration contributes to the emerging literature at the intersection of technology adoption and relationship marketing, demonstrating that logistics technology is not merely an operational tool but a relational investment with measurable loyalty consequences.

C. Contextual Contribution: Indian Urban E-Commerce

The study contributes contextually by locating its findings within the Indian urban e-commerce ecosystem — a context underrepresented in the global logistics trust literature despite India's status as the world's second-largest e-commerce market by user volume.



The Bangalore-specific findings provide a foundation for comparative research across Indian metros and emerging e-commerce markets in South and Southeast Asia.

D. Demographic Moderation of Trust

The finding of significant age-based variation in trust, previously undocumented in the Indian e-commerce tracking literature, contributes to the theory of technology-mediated trust formation by identifying demographic moderators that platform researchers and managers must account for in trust development strategies.

IX. MANAGERIAL CONTRIBUTIONS

A. Implications for Amazon India and Flipkart

As the two dominant platforms in the sample (33.9% and 26.7% preference shares respectively), Amazon India and Flipkart should prioritize the accuracy dimension of their tracking systems. Given that RTDV3 (tracking accuracy) received the highest mean rating, and that $R^2 = 17.6\%$ of trust variance is explained by RTDV, incremental investments in tracking accuracy — through improved GPS integration, carrier data synchronization, and ETA algorithm refinement — will generate measurable trust gains.

The strong trust-retention correlation ($r = 0.886$) quantifies the retention upside: improved trust is strongly predictive of continued customer engagement.

B. Implications for Meesho and Value-Segment Platforms

Meesho (13.7% platform share) serves a predominantly price-sensitive, tier-2 and tier-3 city consumer base. For this segment, real-time tracking may represent a differentiating premium feature rather than a baseline expectation. Investing in basic but reliable tracking (order status updates, delivery confirmation, delay notifications) may generate disproportionate trust gains relative to cost, given the lower baseline tracking exposure of this segment.

C. Implications for Quick-Commerce Platforms

Platforms such as Blinkit, Swiggy Instamart, and Zepto have set a new consumer expectation standard through real-time map-based courier tracking within 10–30 minute delivery windows. This study's finding that 18–20 year-olds (the primary quick-commerce demographic) exhibit below-average trust scores on conventional e-commerce tracking suggests a trust expectation transfer: younger consumers now expect quick-commerce-grade tracking from all e-commerce platforms. Conventional platforms must bridge this expectation gap through richer, more granular tracking experiences.

D. Age-Responsive Interface Design

The finding that consumers above 40 exhibit significantly lower trust scores calls for platform-specific UX interventions. E-commerce platforms should develop age-adaptive tracking interfaces: simplified dashboards with large text and clear status language for older users, proactive outbound SMS or IVR call notifications as app-independent communication channels, and dedicated customer service touchpoints triggered by delivery delay detection. These interventions have the potential to close the trust gap identified in the Above-40 cohort and expand the accessible market for e-commerce among India's growing population of older digital consumers.

E. Operational and Commercial Implications

From an operational standpoint, the study demonstrates that tracking investment is not merely a customer service expenditure but a commercially productive asset that generates measurable increases in trust and retention intentions. Given the cost of customer acquisition in India's competitive e-commerce market, retention — driven by trust, which is driven by delivery visibility — represents a significant return on logistics technology investment. Platform managers should compute the lifetime value uplift associated with trust improvement to build the business case for enhanced tracking infrastructure.

X. POLICY IMPLICATIONS

A. Urban Mobility and Last-Mile Logistics Planning

Indian urban planners and municipal corporations should recognize real-time delivery networks as critical urban infrastructure requiring coordinated planning. The density of delivery vehicles in Bangalore and other metros creates traffic, parking, and road safety challenges. Smart city initiatives should incorporate designated delivery zones, time-window delivery regulations, and digital permit systems that leverage real-time tracking data to optimize delivery flows and reduce urban congestion.

B. Electric Vehicle Logistics Policy

The Government of India's FAME II and state-level EV subsidy schemes provide an opportunity to integrate tracking technology requirements into EV logistics certification frameworks. Policy mandating minimum tracking functionality standards for EV delivery vehicles would simultaneously advance sustainability goals and consumer protection. Real-time tracking of EV battery status and range anxiety mitigation — potentially visible to consumers as part of the green delivery experience — could strengthen both trust and ESG positioning for platforms.



C. Consumer Protection and Delivery Transparency Standards

Regulatory bodies such as the Department for Promotion of Industry and Internal Trade (DPIIT) and the Bureau of Indian Standards (BIS) should consider developing minimum standards for delivery tracking transparency — including mandatory real-time status updates, delay notification requirements, and ETA accuracy thresholds — applicable to all B2C e-commerce platforms operating in India. Such standards would protect consumers, level the competitive playing field, and incentivize continuous improvement in tracking quality.

D. Smart City Integration

Smart city initiatives under the National Smart Cities Mission should explicitly incorporate logistics data from real-time delivery tracking systems into urban traffic management platforms. Aggregated, anonymized delivery network data can inform dynamic signal management, identify last-mile bottleneck corridors, and enable predictive infrastructure maintenance — creating a virtuous feedback loop between logistics technology investment and urban mobility improvement.

XI. LIMITATIONS

This study is subject to several methodological and contextual limitations that readers should consider when interpreting findings and designing future research. First, the cross-sectional research design precludes causal inference; the associations reported between real-time delivery visibility, customer trust, and retention intentions are correlational and should not be interpreted as establishing directionality. Longitudinal designs are necessary to establish causal ordering.

Second, the use of convenience sampling from a single urban centre (Bangalore) limits the geographic generalizability of findings. Bangalore's high technology literacy and above-average digital infrastructure may produce trust and tracking evaluation patterns different from those in tier-2 or tier-3 Indian cities. Third, common method variance is a potential concern in survey-based research where all variables are measured from a single source at a single point in time. Future studies should employ procedural remedies such as Harman's single-factor test or marker variable techniques.

Fourth, the study does not include a formal assessment of convergent and discriminant validity through confirmatory factor analysis; the reliability evidence (Cronbach's alpha) is necessary but not sufficient for full construct validity claims.

Fifth, the relatively modest explained variance in trust ($R^2 = 17.6\%$) reminds researchers and practitioners that delivery tracking, while a significant trust antecedent, operates within a broader ecosystem of platform quality determinants. Finally, the self-reported nature of trust and retention intentions may not perfectly correspond to actual behavioural outcomes.

XII. FUTURE RESEARCH AGENDA

This study opens several productive avenues for future research. Structural equation modelling (SEM) would enable simultaneous testing of the proposed mediating and moderating pathways — specifically whether trust fully or partially mediates the RTDV-to-retention relationship — providing a more rigorous test of the theoretical framework. Longitudinal panel studies tracking trust development across multiple delivery experiences on the same platform would establish causal dynamics and identify whether tracking experience effects are cumulative or diminishing.

Multi-city comparative studies across Indian metropolitan areas (Delhi, Mumbai, Chennai, Hyderabad, Pune) would assess whether Bangalore-specific findings generalize across India's diverse urban e-commerce contexts. Cross-national comparisons with other emerging economies — including Bangladesh, Indonesia, Vietnam, and Nigeria — would situate Indian findings within a global developing-economy framework. Platform-comparative studies directly contrasting trust and retention outcomes across Amazon India, Flipkart, Meesho, Swiggy Instamart, and Blinkit would test whether tracking quality differences between platforms translate into differential trust outcomes.

Future research should examine the role of electric vehicle logistics and green delivery tracking — how visibility into EV-based delivery (including battery health and emission information) influences consumer sustainability perceptions and trust. The integration of AI-driven route optimization and predictive ETA algorithms into tracking systems presents a technological frontier with significant consumer behaviour implications worthy of dedicated investigation. Privacy concerns associated with GPS-enabled real-time tracking represent an under-examined boundary condition on the tracking-trust relationship that warrants qualitative and quantitative exploration.

Finally, the application of eye-tracking and neuroimaging methodologies to understand how consumers process tracking interface information cognitively and emotionally would advance the human-computer interaction dimension of delivery visibility research, informing evidence-based UX design for tracking dashboards.

XIII. CONCLUSION

This study provides rigorous empirical evidence that real-time delivery tracking is a strategically significant trust-building mechanism in Indian urban e-commerce. Using a quantitative, multi-method approach applied to a sample of 275 experienced e-commerce users in Bangalore, the research demonstrates that real-time delivery visibility significantly predicts customer trust ($r = 0.420$, $R^2 = 17.6\%$, $p < .001$), and that customer trust is a very strong predictor of retention intentions ($r = 0.886$, $p < .001$). Age-based variation in trust is significant ($F = 3.253$, $p = .013$), with the 31–40 cohort exhibiting the highest trust and the above-40 cohort exhibiting the lowest — a finding with direct implications for age-responsive UX design. Gender does not moderate trust or retention, indicating universal applicability of tracking transparency as a platform strategy.

Theoretically, the study integrates the Technology Acceptance Model and the Commitment-Trust Theory to explain how logistics technology features generate relational consumer outcomes — an integration that advances both the technology adoption and relationship marketing literatures. Practically, the findings provide a quantified case for e-commerce platforms, logistics service providers, and urban planners to invest in accurate, transparent, and demographically accessible real-time delivery tracking systems as instruments of trust construction, customer retention, and sustainable competitive advantage.

In India's fiercely competitive digital commerce ecosystem, delivery tracking has evolved from a convenience feature to a relational asset. Platforms that master the science of delivery visibility stand to convert operational transparency into lasting customer loyalty.

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