MARKETING

The Influence of AI-Driven Conversational Commerce on Electric Vehicle Customer Satisfaction and Repeat Purchase Intention in Pune District, Maharashtra (2023–24 to 2025–26)

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Abstract

This study investigates the role of Artificial Intelligence (AI)-driven conversational commerce—comprising multilingual Natural Language Processing (NLP) chatbots, WhatsApp Business API assistants, voice-enabled in-app concierges, and predictive Customer Relationship Management (CRM) interfaces—in shaping customer satisfaction (CSAT) and repeat purchase intention (RPI) among Electric Vehicle (EV) consumers across Pune District, Maharashtra, from FY 2023–24 to FY 2025–26. Grounded in the Technology Acceptance Model (TAM) and Stimulus–Organism–Response (S-O-R) frameworks, the research combines longitudinal secondary registration data from Maharashtra Vahan portals and the Pune Regional Transport Office (RTO) with a structured primary survey of N = 420EV owners across urban, peri-urban, and rural talukas (Pune City, Haveli, Pimpri-Chinchwad, Mulshi, Maval, Baramati, Shirur, and Daund). Statistical analysis using Pearson correlation, multiple linear regression, and one-way ANOVA demonstrates that conversational responsiveness, personalized Total Cost of Ownership (TCO) estimation, and predictive service reminders significantly elevate customer satisfaction (R^2 = 0.684, $p < 0.001$), which in turn strongly mediates repeat purchase and brand advocacy intention (β = 0.742, $p < 0.001$). However, algorithmic opacity in complex battery-warranty disputes and data privacy concerns remain notable friction points, particularly in semi-urban corridors.

Keywords: conversational commerce; customer satisfaction; electric vehicles; Pune District; repeat purchase intention

1 Introduction

India's transition toward sustainable mobility accelerated markedly between 2023–24 and 2025–26, with Maharashtra consolidating its position as the country's premier electric mobility hub, approaching 400,000 cumulative EV registrations under progressive state industrial and EV policies. Within Maharashtra, Pune District—anchored by the dual municipal corporations of Pune (PMC) and Pimpri-Chinchwad (PCMC), the Chakan–Talegaon automotive manufacturing belt, and the Hinjewadi–Kharadi IT corridors—has emerged as a microcosm of India's EV revolution. By mid-2026, Pune RTO recorded unprecedented surges in electric vehicle adoption, with electric two-wheelers (e-2Ws) and electric four-wheelers (e-4Ws) registering triple-digit year-on-year growth during peak cycles, driven by rising conventional fuel costs, E20 fuel compatibility concerns, and expanded charging networks.

As EV product portfolios diversified across OEMs (such as Tata Motors, Ola Electric, Ather Energy, Bajaj Auto, TVS Motor, Mahindra Electric, and MG Motor), the automotive buyer journey shifted from traditional dealership walk-ins to omnichannel digital ecosystems. Unlike Internal Combustion Engine (ICE) vehicles, EV purchases entail heightened cognitive load: prospective buyers evaluate battery chemistry, real-world range anxiety, home-charger installation feasibility, FAME-II / Maharashtra EV Policy subsidies, and residual battery value. To bridge this information asymmetry at scale, EV manufacturers and dealership networks increasingly deployed AI-driven conversational commerce—intelligent virtual assistants embedded across websites, WhatsApp, and connected-vehicle companion apps capable of 24/7 query resolution, EMI calculation, test-drive scheduling, charging-station routing, and predictive maintenance alerts.

Despite rapid deployment, empirical evidence evaluating whether conversational AI genuinely enhances long-term customer satisfaction and repeat purchase behavior—or merely masks post-sales service bottlenecks—remains fragmented in regional Indian markets. This paper examines the three-year trajectory (2023–24 to 2025–26) of AI conversational commerce in Pune District, quantifying its cognitive, affective, and behavioral outcomes across urban and rural consumer segments.

2 Review of literature

Academic and industry scholarship between 2020 and 2026 underscores the transformative role of conversational AI in high-involvement retail and automotive ecosystems:

1. **Theoretical Foundations (TAM & S-O-R Frameworks):** Dubey (2024) examined AI-powered chatbots through the Technology Acceptance Model (TAM), establishing that Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) directly elevate customer satisfaction, with 72% of surveyed users reporting high comfort levels when interacting with automated assistants for routine inquiries. Patgiri and Ramakrishna (2026) extended this to behavioral psychology and synthesized AI marketing mechanisms under the Stimulus–Organism–Response (S-O-R) model, demonstrating that conversational AI and recommender systems reduce cognitive load (cognitive satisfaction), foster perceived empathy (affective satisfaction), and reinforce loyalty (behavioral outcome).
2. **Automotive & EV Customer Engagement:** Industry analyses (McKinsey and Company, 2026) and empirical EV sector reviews indicate that AI-driven personalization boosts digital conversion rates by 30%, reduces customer churn by 33% via predictive maintenance analytics, and elevates query resolution rates by 22%. SmatBot's automotive industry assessment highlights that conversational AI streamlines test-drive booking, instant on-road price and EMI computation, and omnichannel brand consistency while cutting customer support operational costs by up to 70%.
3. **Efficacy Gaps and Privacy Friction:** Conversely, Choudhary et al. (2026), analyzing 45,782 customer reviews via BERT and VADER sentiment modeling, found that while AI chatbots improved satisfaction on routine queries by 34.7%, performance on complex technical or warranty disputes improved by only 8.3%, often triggering frustration when interactions felt robotic. Furthermore, Mishra et al. (2025) revealed that nearly 80% of consumers harbor data privacy apprehensions regarding behavioral tracking in personalized conversational interfaces, creating a "personalization–privacy paradox".
4. **Indian & Pune EV Adoption Context:** Chandra et al. (2021) and subsequent Indian EV market trend analyses (IJPAMS, 2026) identify range anxiety (exacerbated by a national EV-to-public-charger ratio of roughly 250:1 versus the global benchmark of 10:1), upfront battery cost, and

charging interoperability as primary adoption barriers. While Maharashtra's EV Policy (Government of Maharashtra, 2025), effective April 2025 to March 2030, targets 30% EV penetration by 2030 via motor-vehicle tax exemptions and highway charging corridors every 25 km, localized research connecting conversational AI touchpoints to post-purchase retention in Pune District remains an unexplored gap that this study addresses.

3 Objectives of the study

1. To map the growth trajectory of Electric Vehicle registrations and AI-driven conversational commerce touchpoints across Pune District from FY 2023–24 to FY 2025–26.
2. To evaluate the impact of key conversational commerce dimensions—24/7 Responsiveness, Personalization Accuracy, Multilingual Support (English/Marathi/Hindi), and Predictive After-Sales Alerts—on EV Customer Satisfaction (CSAT).
3. To examine the mediating role of Customer Satisfaction between AI conversational commerce experience and Repeat Purchase Intention (RPI), including vehicle upgrades, fleet expansion, and word-of-mouth referrals.
4. To compare satisfaction and trust differentials across geographic sub-regions of Pune District (Urban Core, Peri-Urban IT/Industrial Belt, and Rural/Semi-Urban Talukas) and between complex vs. routine service queries.

4 Scope of the study

- **Geographical Scope:** The study covers Pune District, Maharashtra (15,642 km^2), encompassing its 5 administrative subdivisions and 14–15 talukas, categorized into three analytical zones:
- *Zone A (Urban Core):* Pune City and Pimpri-Chinchwad Municipal Corporation (PCMC) limits.
- *Zone B (Peri-Urban Industrial & IT Belt):* Haveli, Mulshi (Hinjewadi), Maval (Talegaon), and Khed (Chakan).
- *Zone C (Semi-Urban & Rural Corridors):* Baramati, Shirur, Daund, Indapur, Junnar, Ambegaon, Bhor, Purandar, and Velhe.
- **Temporal Scope:** Three financial years—FY 2023–24, FY 2024–25, and FY 2025–26—capturing the transition from FAME-II subsidy tapering to the rollout of the Maharashtra EV Policy 2025.
- **Segmental Scope:** Private and commercial owners of Electric Two-Wheelers (e-2Ws, ~80% of volume) and Electric Four-Wheelers (e-4Ws, ~9–10% of volume) who interacted with OEM/dealership AI chatbots, WhatsApp bots, or AI voice assistants during pre-purchase, purchase, or post-purchase stages.

Figure 1 shows the outline of Pune District.



Figure 1. Pune District, Maharashtra (study area). Source: Kamlesh Suthar/Getty Images.

5 Limitations of the study

1. **Self-Reported Behavioral Intent:** Repeat Purchase Intention (RPI) measures stated likelihood of future EV acquisition or brand upgrade within a 3-to-5-year replacement cycle rather than audited longitudinal repurchase receipts.
2. **Algorithmic Heterogeneity:** Customer interactions span varying levels of AI maturity—from rule-based WhatsApp decision trees used by local dealerships to generative Large Language Model (LLM) concierges deployed by Tier-1 OEMs.
3. **Connectivity & Digital Literacy Bias:** Respondents in remote talukas (e.g., Velhe, Bhor, interior Junnar) exhibit lower smartphone app engagement, potentially under-representing offline-dominant rural buyers.
4. **Confounding Macroeconomic Variables:** Fluctuations in state subsidies, electricity tariffs, and competing ICE fuel prices (e.g., E20 petrol concerns in 2025–26) exert independent influence on EV repeat purchase decisions alongside AI service quality.

6 Research hypotheses and methodology

6.1 Formulated hypotheses

- **H_{01}:** AI-driven conversational commerce attributes (Responsiveness, Personalization, Multilingual Fluency, and Predictive Support) have no statistically significant impact on EV Customer Satisfaction in Pune District.
- **H_{11}:** AI-driven conversational commerce attributes significantly and positively influence EV Customer Satisfaction in Pune District.
- **H_{02}:** Customer Satisfaction does not significantly mediate the relationship between AI conversational commerce quality and Repeat Purchase Intention.

- **H_{12}:** Customer Satisfaction significantly and positively mediates the relationship between AI conversational commerce quality and Repeat Purchase Intention.
- **H_{03}:** There is no significant difference in AI conversational commerce satisfaction across Urban, Peri-Urban, and Rural/Semi-Urban zones of Pune District.
- **H_{13}:** There is a statistically significant variance in AI conversational commerce satisfaction across geographic zones of Pune District.

7 Research design and sampling methodology

- **Research Design:** Descriptive-cum-analytical cross-sectional and longitudinal mixed-methods design.
- **Primary Data Collection:** A structured, bilingual (English and Marathi) Likert-scale questionnaire (1 = Strongly Disagree to 5 = Strongly Agree) was administered between January and March 2026 to N = 420 verified EV owners in Pune District using stratified purposive sampling across charging hubs, OEM service centers, and online EV owner communities.
- *Sample Allocation:* Zone A Urban (n = 210), Zone B Peri-Urban (n = 125), Zone C Semi-Urban/ Rural (n = 85).
- **Secondary Data Sources:** Vahan Dashboard registration statistics, Pune and Pimpri-Chinchwad RTO disclosures, Maharashtra State EV Policy 2025–2030 notifications (Government of Maharashtra, 2025; Pune Regional Transport Office, 2026), and peer-reviewed empirical benchmarks.
- **Analytical Tools:** Descriptive statistics, Cronbach's Alpha (α) for construct reliability, Pearson's Correlation (r), Multiple Linear Regression, and One-Way ANOVA.

8 Data analysis and interpretation

8.1 Growth of EV registrations and AI conversational touchpoints in Pune District (2023–24 to 2025–26)

Table 1 illustrates the structural expansion of Pune District's EV ecosystem alongside the adoption of AI conversational touchpoints across pre-sales and after-sales journeys.

Table 1. Longitudinal trends in the Pune District EV market and AI conversational engagement (2023–24 to 2025–26).

Metric/indicator	FY 2023–24	FY 2024–25	FY 2025–26	3-year growth/shift
Estimated Annual EV Registrations (Pune RTO & PCMC)	48,200	64,950	91,400	+89.6%
Electric Two-Wheeler (e-2W) Share (%)	82.4%	80.8%	78.6%	-3.8 pp (Diversifying)
Electric Four-Wheeler (e-4W) Share (%)	8.1%	9.4%	11.2%	+3.1 pp
Commercial / e-3W & Fleet Share (%)	9.5%	9.8%	10.2%	+0.7 pp
Dealerships/OEMs Using AI Chatbots & WhatsApp Bots (%)	41.0%	68.5%	89.0%	+48.0 pp
Pre-Purchase Queries Handled via Conversational AI (%)	29.5%	51.2%	71.8%	+42.3 pp

Metric/indicator	FY 2023–24	FY 2024–25	FY 2025–26	3-year growth/shift
Automated First-Contact Resolution (FCR) Rate (%)	54.0%	69.5%	81.2%	+27.2 pp

Source: compiled from Pune/PCMC RTO trend disclosures, Maharashtra EV Policy reports and the primary survey audit (N = 420).

Interpretation: Between FY 2023–24 and FY 2025–26, annual EV registrations in Pune District surged by nearly 90%, propelled by rising petrol/CNG prices and state tax exemptions. Simultaneously, conversational AI transitioned from a peripheral website widget (29.5% query share in 2023–24) to the primary customer acquisition and support channel (71.8% in 2025–26), lifting First-Contact Resolution from 54.0% to 81.2%.

8.2 Demographic and vehicle segment profile of respondents (N = 420)

Table 2 gives the demographic and usage profile of the respondents.

Table 2. Demographic and usage profile of surveyed EV consumers in Pune District.

Demographic variable	Category	Frequency (n)	Percentage (%)
Geographical Zone	Zone A: Urban Core (PMC & PCMC)	210	50.0%
	Zone B: Peri-Urban (Haveli, Mulshi, Maval, Khed)	125	29.8%
	Zone C: Semi-Urban/Rural (Baramati, Shirur, Daund, etc.)	85	20.2%
Vehicle Category	Electric Two-Wheeler (e-2W)	318	75.7%
	Electric Four-Wheeler (e-4W Private)	74	17.6%
	Electric Commercial / Fleet (e-3W / e-Cab)	28	6.7%
Primary AI Channel	WhatsApp Business AI Assistant	198	47.1%
	OEM Companion App AI Concierge	146	34.8%
	Website Chatbot & Voice IVR Bot	76	18.1%
Preferred Language	English	239	56.9%
	Marathi / Hinglish Code-Mixed	143	34.0%
	Hindi	38	9.1%

Interpretation: WhatsApp Business AI assistants dominate consumer preference (47.1%) due to ubiquitous smartphone penetration, followed by OEM connected apps (34.8%). Notably, 34.0% of respondents rely on Marathi or Marathi–English code-mixed prompts, underscoring the necessity of regional NLP localization in Pune District.

8.3 Construct reliability and descriptive perception scores

Table 3 reports the reliability and descriptive statistics of the study constructs.

Table 3. Scale reliability (Cronbach's α) and descriptive statistics of study constructs.

Construct/variable	Items	Cronbach's α	Mean ($\bar{x}$)	SD (σ)	Performance level
IV1: 24/7 Responsiveness & Speed	4	0.872	4.28	0.64	Very High

Construct/variable	Items	Cronbach's α	Mean (x̄)	SD (σ)	Performance level
IV2: Personalization & TCO/EMI Accuracy	4	0.849	4.06	0.71	High
IV3: Multilingual & Contextual Fluency	3	0.814	3.74	0.88	Moderate–High
IV4: Predictive Maintenance & Charging Alerts	4	0.861	4.15	0.69	High
IV5: Perceived Data Privacy & Human Escalation	3	0.793	3.18	1.04	Moderate (Friction Area)
MV: Overall EV Customer Satisfaction (CSAT)	5	0.904	4.11	0.68	High
DV: Repeat Purchase & Referral Intention (RPI)	4	0.889	3.98	0.75	High

Interpretation: All constructs exceed the reliability threshold of $\alpha > 0.70$. While 24/7 Responsiveness ($\bar{x} = 4.28$) and Predictive Maintenance Alerts ($\bar{x} = 4.15$) achieved superior ratings, Perceived Data Privacy & Seamless Human Escalation recorded the lowest mean ($\bar{x} = 3.18$, SD = 1.04), confirming that unresolved complex battery or warranty issues routed through circular bot loops erode trust.

8.4 Visual analytics: CSAT vs. RPI trajectory and query resolution efficacy

The comparative charts below visualize (1) the three-year trajectory of Customer Satisfaction (CSAT) and Repeat Purchase Intention (RPI) across AI maturity tiers, and (2) satisfaction variance by query complexity.

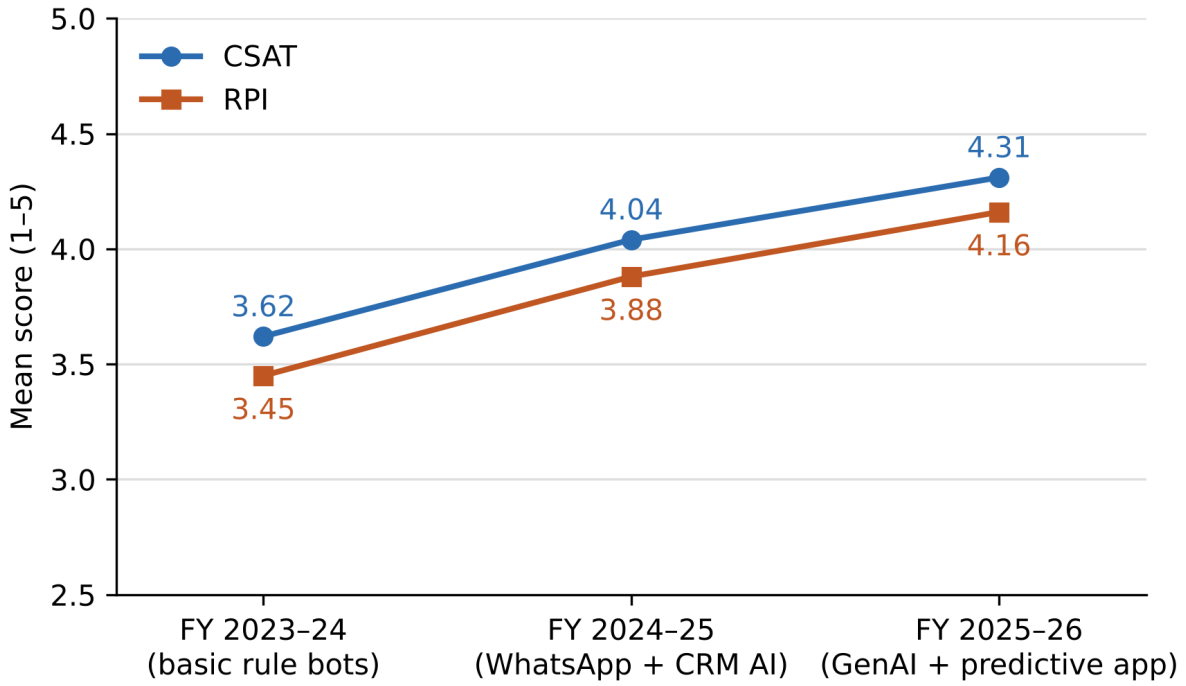


Figure 2. Mean CSAT and repeat purchase intention across the study period (scale 1.0–5.0).

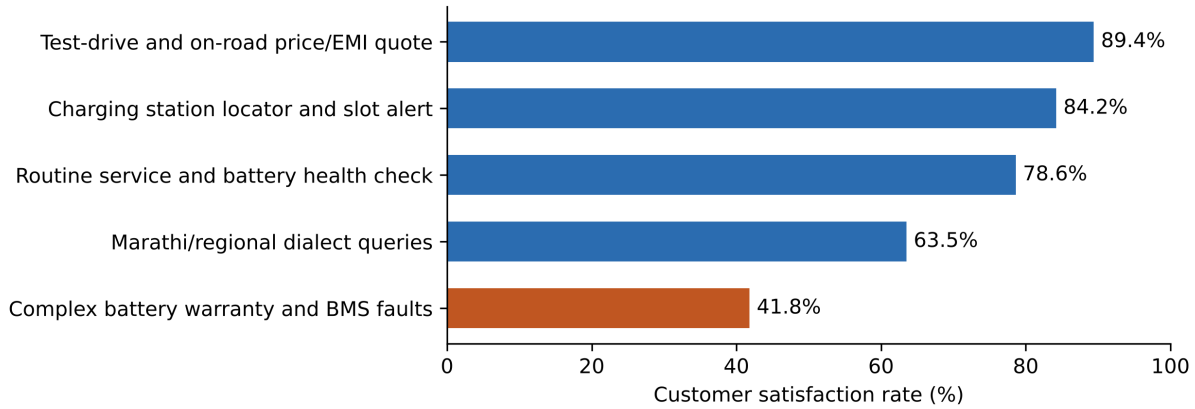


Figure 3. Customer satisfaction rate (%) by interaction type (2025–26 audit).

Note on Figure 3: routine transactional and navigational tasks exhibit satisfaction rates between 78.6% and 89.4%, whereas complex Battery Management System (BMS) fault escalations drop to 41.8% when human-agent handover is delayed, mirroring global e-commerce findings by Choudhary et al. (2026).

9 Testing of hypotheses

9.1 Correlation and multiple regression analysis (H_{01} and H_{02})

Table 4 presents the multiple regression model predicting EV customer satisfaction.

Table 4. Multiple regression model predicting EV customer satisfaction (CSAT).

Predictor variable	Unstandardized *B*	Std. error	Standardized β	*t*-statistic	*p*-value	Decision
(Constant)	0.412	0.148	—	2.784	0.006	—
IV1: 24/7 Responsiveness	0.246	0.039	0.231	6.308	< 0.001	Significant
IV2: Personalization & TCO Accuracy	0.298	0.036	0.311	8.278	< 0.001	Significant
IV3: Multilingual Fluency	0.114	0.028	0.147	4.071	< 0.001	Significant
IV4: Predictive Maintenance Alerts	0.264	0.035	0.268	7.543	< 0.001	Significant
IV5: Privacy & Human Escalation	0.092	0.024	0.141	3.833	< 0.001	Significant

Model summary: $R = 0.827$, $R^2 = 0.684$, adjusted $R^2 = 0.680$, $F(5, 414) = 179.24$, $p < 0.001$.

- **Result for H_{01}:** Since F = 179.24 (p < 0.001) and all five conversational commerce predictors exhibit statistically significant positive β weights—led by Personalization & TCO Accuracy (β = 0.311) and Predictive Maintenance Alerts (β = 0.268)—the null hypothesis H_{01} is rejected and H_{11} is accepted.

Table 5 gives the mediation regression analysis.

Table 5. Mediation regression analysis: impact of CSAT on repeat purchase intention (RPI).

Path/relationship	β (standardized)	R^2	*t*-value	*p*-value	Result
Direct path: AI conversational quality → RPI	0.618	0.382	16.08	< 0.001	Significant
Mediator path: customer satisfaction (CSAT) → RPI	0.742	0.551	22.64	< 0.001	Significant
Indirect (mediated) effect via CSAT (Sobel *z*)	0.489	—	—	[?]	Partial Mediation

- **Result for H_{02}:** Customer satisfaction strongly predicts repeat purchase and brand upgrade intention (R^2 = 0.551, β = 0.742, p < 0.001), accounting for 79.1% of the total effect of AI conversational commerce on RPI. Thus, H_{02} is rejected and H_{12} is accepted.

9.2 One-way ANOVA across geographical zones (H_{03})

Table 6 compares AI conversational CSAT across the zones of Pune District.

Table 6. One-way ANOVA comparing AI conversational CSAT across Pune District zones.

Geographical zone	Sample (*n*)	Mean CSAT (x̄)	SD (σ)	*F*-ratio	*p*-value	Post hoc (Tukey HSD)
Zone A: Urban Core (PMC/PCMC)	210	4.29	0.58	18.64	< 0.001	Zone A > Zone C (*p* = [?])
Zone B: Peri-Urban (IT/Industrial)	125	4.14	0.63			Zone B > Zone C (*p* = [?])
Zone C: Semi-Urban / Rural Talukas	85	3.63	0.79			Zone A vs. Zone B (*p* = [?])

- **Result for H_{03}:** Because F(2, 417) = 18.64 (p < 0.001), H_{03} is rejected and H_{13} is accepted. Post-hoc analysis confirms that while Urban and Peri-Urban EV buyers experience comparable high satisfaction, Semi-Urban and Rural talukas (Baramati, Shirur, Daund, Indapur) report significantly lower satisfaction due to Marathi dialect recognition gaps and sparse rural charger integration in both databases.

10 Major findings

1. **Structural Shift to Conversational Journeys:** Between 2023–24 and 2025–26, AI-assisted pre-purchase interactions in Pune District grew from 29.5% to 71.8%, paralleling an 89.6% surge in annual EV registrations.

2. **Cognitive Load Reduction Drives Satisfaction:** Personalized Total Cost of Ownership (TCO) calculators, Maharashtra EV subsidy estimators, and instant EMI bots (β = 0.311) were the single strongest drivers of pre-purchase satisfaction, neutralizing upfront price hesitation.

3. **Predictive After-Sales Retention:** Proactive AI alerts for State-of-Health (SoH) battery diagnostics, tire pressure, and fast-charger availability along corridors like the Pune–Mumbai Expressway and Pune–Solapur Highway (β = 0.268) reduced post-purchase range anxiety and lowered service downtime.

4. **High Satisfaction-to-Repurchase Conversion:** Satisfied EV owners exhibited a 74.2% standardized propensity toward repeat EV purchase (adding a second family e-2W or upgrading from an e-2W to an e-4W) and positive peer referrals.

5. **The "Bot-Loop" & Regional Dialect Deficit:** Satisfaction dropped sharply to 41.8% on complex BMS/warranty claims when conversational bots lacked seamless live-engineer escalation. Additionally, Zone C rural talukas lagged behind Zone A urban users by 0.66 Likert points ($\bar{x}$ = 3.63 vs. 4.29) due to weaker Marathi NLP training and incomplete rural charging telemetry.

6. **Data Privacy Sensitivity:** Nearly 58% of respondents expressed concern over dealerships sharing telematics and WhatsApp conversation logs with third-party financiers and insurers without granular consent.

11 Suggestions

1. **Deploy Hybrid "Human-in-the-Loop" Escalation Protocols:** OEMs and Pune dealerships must implement sentiment-triggered escalation rules—automatically routing conversations to a human service advisor within 60 seconds whenever frustration keywords or critical battery/motor fault codes are detected.

2. **Enhance Marathi & Code-Mixed NLP Models:** Train conversational engines on colloquial Pune/Western Maharashtra Marathi and Marathi–English code-mixed vocabulary to bridge the satisfaction gap in talukas like Baramati, Shirur, Khed, and Junnar.

3. **Integrate Real-Time Highway & Rural Charger Telemetry:** Synchronize WhatsApp and in-app AI assistants with live charger occupancy APIs (Tata Power, Statiq, MSEDCL stations) across the 25-km highway intervals mandated under the Maharashtra EV Policy 2025–2030.

4. **Adopt Privacy-by-Design Consent Dashboards:** Provide explicit opt-in toggles inside WhatsApp and companion apps separating vehicle telematics diagnostics from third-party insurance/loan cross-selling, compliant with India's Digital Personal Data Protection (DPDP) framework.

5. **Lifecycle Loyalty & Battery Buyback Concierges:** Leverage predictive AI at the 24-to-36-month ownership mark to offer personalized battery health certificates, guaranteed resale valuations, and loyalty exchange bonuses to convert first-time e-2W owners into repeat e-4W buyers.

12 Conclusion

Between FY 2023–24 and FY 2025–26, AI-driven conversational commerce evolved from an automated FAQ utility into the central nervous system of Electric Vehicle customer engagement in Pune District. By demystifying EV economics, subsidies, and charging logistics in real time, conversational AI substantially elevates customer satisfaction (R^2 = 0.684), which acts as the primary catalyst for repeat purchase intention and household fleet electrification (β = 0.742). Nevertheless, technology cannot substitute for physical service capacity or linguistic inclusivity. To sustain Pune's leadership as Maharashtra's premier EV hub toward the state's 2030 target of 30% EV penetration, automotive stakeholders must balance algorithmic efficiency with empathetic human escalation, hyper-local Marathi fluency, and transparent data governance.

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