Electric Vehicle Adoption in India: Consumer Behaviour and Industry Dynamics

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Abstract:

India's electric vehicle (EV) market has grown from a niche to a visible, though still small, share of new vehicle sales in under five years, yet the transition remains uneven across vehicle segments, regions and income groups. This paper reviews post-2020 literature on two interlinked dimensions of that transition: how Indian consumers form EV purchase decisions, and how firms are reorganising products, supply chains and business models in response. On the demand side, the evidence points to upfront price, range, charging availability and battery durability as the dominant concerns, with environmental attitudes and social influence working mainly through attitudes rather than as direct drivers; buyers of two- and three-wheelers respond to economics and usage patterns very differently from car buyers. On the supply side, the review traces the contest between incumbents and start-ups in cars and two-wheelers, the push towards battery and component localisation, partnerships and joint ventures, and newer models such as battery leasing, fleet contracts, battery swapping and conversions. The paper then maps firm strategies against the consumer barriers they target and identifies gaps, notably the scarcity of segment-level behavioural evidence for India and of firm-level performance data. It argues that adoption will be decided where consumer concerns and industrial strategy meet, and it sets out a research agenda for examining that intersection.

1. Introduction:

The shift to electric mobility has become central to how countries think about sustainable transport, and the research it has generated spans economics, engineering, environmental science and public policy. Much of the early work examined single themes, such as consumer preferences or battery performance, in isolation and for a narrow set of countries. There is now a wider view that these strands must be read together if we are to understand how electrification unfolds inside particular national economies, especially emerging ones. Advanced economies such as the United States and Japan, and large developing economies such as China and India, have all written EV promotion into their economic and environmental policy as a way of cutting carbon emissions and modernising transport (Barretto, 2021).

India is an instructive case. Electric vehicles made up only about 0.7 percent of new vehicle sales in 2020 but roughly 6–7 percent by 2024 (IEA, 2024; NITI Aayog, 2025), and the stock of EVs on the road passed 5.5 million in early 2025. Growth has been concentrated in two- and three-wheelers: electric two-wheelers alone accounted for more than 57 percent of EV sales in 2023–24. The government has set a target of 30 percent electric share in new vehicle sales by 2030 and backed it with national and state incentives. Passenger cars, however, tell a different story. EVs were only around 2.5 percent of new car sales in 2024 (Singh, 2025), and the

International Energy Agency (2024) observes that India's penetration, although rising, trails that of China, Europe and the United States. That India has needed nearly a decade to reach about 7 percent of sales shows how demanding the 2030 target is (NITI Aayog, 2025).

This paper narrows its lens to two dimensions of the transition: consumer behaviour and industry dynamics. Adoption needs both a willing buyer and a capable supplier, and each shapes the other. Consumers' concerns about price, range and reliability define the problems firms must solve; firms' decisions on pricing, products, financing and service in turn change what buyers regard as reasonable. Policy, technology and charging infrastructure are treated here as the setting in which that exchange takes place rather than as subjects in their own right. The review asks three questions. First, which factors shape the decisions of Indian consumers, and how do they differ across vehicle segments and groups of buyers? Second, how are incumbent manufacturers, start-ups and firms from adjacent sectors responding through competition, localisation, partnerships and new business models? Third, where do the two sets of answers meet, and what remains unexplored?

The paper is a narrative, thematic review. It draws mainly on studies published after 2020, with references running to 2025, and gives priority to India-specific work while using international studies where they clarify the Indian situation. Peer-reviewed behavioural research is supplemented by reports from think tanks, government agencies and industry bodies, and by press analysis for recent firm-level developments. The latter are valuable for their timeliness but are less rigorously validated, and the discussion flags where that matters. Section 2 reviews consumer behaviour and adoption dynamics. Section 3 examines firm-level strategies and industry dynamics. Section 4 connects the two, Section 5 sets out gaps and a research agenda, and Section 6 concludes.

2. Consumer Behaviour and Adoption Dynamics

Accelerating adoption in a country as varied as India requires an understanding of what consumers want, fear and trust. Read together, the studies suggest a hierarchy. Economic and functional considerations dominate, while psychological and social factors play a supporting role that is growing in importance.

2.1 Price, cost of ownership and the elasticity of demand

Researchers have long identified high purchase price, range anxiety and sparse charging infrastructure as the main deterrents to buying an EV (Boulanger et al., 2011), and recent Indian evidence repeats the list. A national survey by TERI in 2022 found that upfront cost, worries about battery life and replacement cost, and range anxiety were the leading reasons prospective buyers held back (Parmeet Singh, 2022). Studies elsewhere agree that the higher sticker price

of an EV relative to a comparable petrol vehicle is the main constraint, even though EVs are cheaper to run over their lifetime (Adepetu & Keshav, 2017; Lutsey & Nicholas, 2023). Buyers recognise the savings on fuel and maintenance, but affordability at the point of sale weighs more heavily in the decision.

Simulation evidence sharpens the point. Adepetu and Keshav (2017), using an agent-based model of Los Angeles, found that lengthening battery range produced only a small gain in adoption while batteries remained costly, whereas lowering the price of EVs had a much larger effect. Their conclusion, that measures to cut the effective cost of an EV, such as subsidies or battery leasing, outperform measures addressing range alone, is relevant to India, where price parity with internal combustion engine (ICE) vehicles is still some years away for most segments (Lutsey & Nicholas, 2023). The result should nevertheless be transferred with care, since it comes from a high-income, car-dependent city with a different vehicle mix and income distribution.

India's own record of revealed behaviour is consistent with high price sensitivity. Where incentives have brought the total cost of ownership into line with ICE alternatives, buyers have moved quickly. In 2022–23 an electric auto-rickshaw, after subsidy, cost roughly the same to own as a CNG auto-rickshaw, and electric three-wheelers rose to more than half of new three-wheeler registrations by 2023 (ICCT, 2024). In two-wheelers, sales climbed from about 152,000 units in 2021 to more than 600,000 in 2022 after FAME-II support was raised (ICCT, 2024; IEA, 2023). When the per-kWh subsidy was cut from ₹15,000 to ₹10,000 in mid-2023, monthly e-scooter sales fell noticeably (ICCT, 2024). These episodes point to strongly elastic demand, although they cannot be read as clean estimates, because model launches, supply expansion and delays in subsidy disbursement moved at the same time as price. They also show that a good part of today's demand is policy-contingent, which makes the period after subsidies taper a critical test of how durable consumer interest really is.

2.2 Range, charging access and product attributes

After price, driving range and charging convenience are the most influential factors. In a discrete-choice experiment on electric two-wheeler buyers in Bangalore, Bhat and Verma (2024) found that longer range and a dense charging network raised the probability of choosing an electric two-wheeler, long charging times lowered it sharply, and higher purchase price and higher expected operating costs also reduced stated purchase likelihood. Indian consumers, in other words, appear to measure EVs against the convenience of the ICE vehicles they know, and many hesitate when an EV cannot travel as far or refuel as quickly. Evidence from Germany points the same way: Rasouli and Timmermans (2013) report that attributes such as

range, performance and fuel economy outweigh peer influence in car choice, implying that buyers principally want the product to do its job.

Access to charging is closely tied to this. Surveys indicate that over 80 percent of current EV owners charge mainly at home or at work (TERI, 2023), which favours households with dedicated parking and disadvantages apartment dwellers who face shared parking and metering. Public charging matters for confidence even among people who rarely use it. India had roughly 400 EVs per public charger in late 2023, against a global average of around 30 (IEA, 2023), and regional patterns show faster growth in cities and states with denser charger coverage, such as Delhi, Karnataka and Maharashtra (Soman et al., 2022). Visible infrastructure therefore works on perception as well as on convenience.

2.3 Attitudes, social influence, information and trust

Practical barriers dominate, but psychological and social factors are increasingly recognised, particularly among urban, educated and younger buyers. Work based on the Theory of Planned Behaviour is informative about how these factors operate. Khurana, Kumar and Sidhpuria (2020) found that attitude was the strongest predictor of the intention to buy an EV, and that attitude was shaped in turn by social influence and perceived environmental benefit. Perceived economic benefits such as fuel savings did not predict intention directly but raised it indirectly by improving attitudes. The implication is that financial and non-financial appeals work together: a buyer who feels that an EV fits a socially responsible or forward-looking self-image is more likely to form a favourable intention. Subjective norms, including the wish for social approval or status, also influence purchase decisions (Wolf et al., 2015; Khurana et al., 2020).

Context matters for these effects. Sovacool et al. (2019b) link willingness to adopt in China to the perceived modern image of EVs and to policy support, while Sovacool et al. (2019a) show that political orientation and urban or rural residence shaped attitudes in northern Europe. The social meaning of an EV is therefore not fixed; it varies with place and with who is communicating it.

Information and trust form a further layer. Many Indian consumers remain unfamiliar with current EV technology and with the charging network in their area, and outdated beliefs persist, for instance that batteries will fail soon or that charging is practically impossible. Consumer education is repeatedly identified as a way of correcting such misperceptions (Turcksin et al., 2013). Trust is also vulnerable to events. After a series of electric scooter battery fires in early 2022, regulators tightened battery safety norms (AIS 156 and AIS 038 Rev 2) and made compliance mandatory for subsidy eligibility by late 2022. A single widely reported incident

can undo the reassurance built by years of marketing, which is why safety performance has become part of the commercial proposition rather than a purely technical matter.

2.4 Differences across segments, regions and income groups

Aggregate adoption figures hide sharp differences between vehicle types. Two- and three-wheelers lead India's transition while electric cars lag in volume, and the literature traces this to usage patterns and economics. Electric scooters and motorcycles typically serve short urban commutes that sit well within a range of 50–100 km, which blunts range anxiety. Several models now cost close to petrol equivalents once fuel and maintenance savings are counted (IEA, 2023; IBEF, 2025a), and a small battery can be charged overnight from a standard socket. Makers such as Ather Energy and Ola Electric have also built dedicated charging networks for their scooters to support buyer confidence (IBEF, 2025a). Commuters and delivery workers have taken up electric two-wheelers rapidly as a result.

Car buyers are more demanding. They expect longer range and strong performance, including air-conditioning and highway speeds, and they want to make inter-city journeys, which requires reliable fast charging. Until recently the available models were largely higher-priced SUVs, and fast chargers on highways were scarce. Adoption has therefore centred on a narrow group of environmentally conscious early adopters, corporate and taxi fleets, and luxury buyers. EVs accounted for only about 2.5 percent of the 4.3 million passenger cars sold in 2024, and press analysis suggests a rise towards 4 percent in early 2025 as cheaper models arrived (Singh, 2025; IEA, 2024). Surveys identify the scarcity of public charging and long recharge times as the main reasons buyers hesitate to treat an EV as an all-purpose family car (Sharma & Maheshwari, 2023; Soman et al., 2022).

Geography and income add further variation. States with stronger incentives and explicit adoption targets, such as Delhi's aim of 25 percent of new sales by 2024, show markedly higher uptake than those without (Sharma & Maheshwari, 2023; ICCT, 2024). Lower-income and rural consumers have so far been largely absent from the market. European evidence suggests that lower-income buyers place fewer demands on range and could form a market for simple, low-cost, short-range EVs (Sovacool et al., 2019a), but whether this holds in India has not been tested. If it does, the next phase of adoption may depend less on the urban affluent buyer than on products and infrastructure designed for different needs.

2.5 Synthesis of consumer determinants

Table 1 summarises the determinants discussed above. The pattern is consistent. Price and cost of ownership are the strongest levers; range and charging access determine whether a vehicle is seen as usable; attitudes, norms and information determine whether a favourable

intention forms at all; and trust in battery safety and durability is a precondition that is easily damaged. Because these determinants carry different weight across segments, aggregate averages are poor guides to firm strategy or policy design.

Table 1. Determinants of EV adoption among Indian consumers

Determinant	Pattern in the evidence	Where it matters most
Purchase price	Leading barrier in the TERI survey; price cuts outperform range gains in simulation (Parmeet Singh, 2022; Adepetu & Keshav, 2017)	All segments; most acute for cars
Cost of ownership	Parity with CNG and petrol alternatives after subsidy drives rapid uptake (ICCT, 2024)	High-use two- and three-wheelers
Range	Longer range raises choice probability (Bhat & Verma, 2024); short urban trips reduce its importance	Cars and inter-city use
Charging access and time	Long charging times deter; adoption is faster where chargers are denser (Soman et al., 2022); most charging is at home (TERI, 2023)	Cars; apartment dwellers
Battery durability and safety	Concern about life and replacement cost (Parmeet Singh, 2022); 2022 fire incidents prompted new norms	All segments
Attitudes and social norms	Attitude is the strongest predictor of intention and mediates other effects (Khurana et al., 2020; Wolf et al., 2015)	Urban, educated, younger buyers
Information and awareness	Education corrects outdated beliefs (Turcksin et al., 2013)	First-time buyers; smaller cities
Policy incentives	Strongly elastic response to subsidy changes (ICCT, 2024; IEA, 2023)	Two- and three-wheelers

Source: Authors' synthesis of the studies cited.

3. Industry Dynamics and Firm-Level Strategies

The move to electric mobility is an industrial and competitive upheaval as much as a technological one. Incumbent manufacturers, EV start-ups, component suppliers and energy companies are all repositioning. This section reviews how firms operating in India are responding, using the literature together with industry analyses. Because much firm-level information comes from company reports and the business press, the evidence here is generally more descriptive and less systematically validated than the behavioural studies reviewed in Section 2.

3.1 Passenger cars: from early movers to a contested market

In the early phase of the market, roughly 2015–2020, a few firms accounted for the limited sales, notably Mahindra with its e2o micro-EV and electric Verito sedan, and Tata Motors with an electric Tigor sedan for fleet use. The picture changed from 2020. Tata Motors became the leader in electric passenger cars by adapting popular ICE models, and the Nexon EV, launched in 2020, became India's first relatively affordable long-range EV, with a real-world range above 200 km. By building on existing vehicle platforms and in-house electric powertrains (branded Ziptron), Tata could price the Nexon EV at about ₹14–17 lakh, well below long-range rivals that were mostly imported and priced from ₹25 lakh. The result was a first-mover advantage, with Tata holding roughly 70–80 percent of the segment by FY2023 (Tata Motors, 2023).

Rivals have since gained ground. MG Motor India, a subsidiary of SAIC partnered with the JSW Group, entered with the ZS EV in 2020 and later added the compact MG Comet at around ₹8 lakh, and its share of electric car sales reportedly rose to 25–30 percent by 2025, largely at Tata's expense. Mahindra & Mahindra entered later but committed heavily, launching the XUV400 and announcing an electric-only "Born Electric" SUV range backed by a partnership with Volkswagen for EV components; its EV sales grew by more than 300 percent in 2025, giving it an estimated 10–15 percent share. Tata's share fell to about 50–60 percent by mid-2025 from above 70 percent a year earlier (Singh, 2025). Tata's response has been to commit about US$2 billion to its EV business, targeting ten new models by 2026, and to set up a dedicated EV plant in Gujarat (Tata Motors, 2023).

Singh (2025) argues that this contest reveals what Indian buyers value. In his account, consumers ultimately seek value and reliability over novelty. Tata's EV sales growth slowed in 2024 partly because of real competition and partly because some fleet customers deferred purchases as FAME-II wound down. Tata's pricing of the Tiago EV hatchback from around ₹8.5 lakh, then India's cheapest electric car, drew 10,000 bookings in a day, which signals considerable latent demand when the price is right. MG's combination of feature-rich, affordable models and a battery-lease option, and Mahindra's positioning of its EVs as aspirational yet green, show different routes to the same end: matching products to local priorities of affordability, running-cost savings and status.

3.2 Two-wheelers: start-ups, incumbents and a volatile hierarchy

In two-wheelers the sequence was reversed. Start-ups took the early lead while established motorcycle and scooter makers lagged. Hero Electric (unrelated to Hero MotoCorp), Okinawa, Ampere, Ather Energy and Ola Electric were among the leading sellers of electric scooters by

2021–22. Ather launched premium scooters with fast charging and smart dashboards and built a reputation for performance and quality. Ola Electric, backed by substantial venture funding, built a large "Futurefactory" in Tamil Nadu and launched its S1 scooter in late 2021 with heavy marketing; it claimed the top monthly sales position for a time, although quality problems and delivery delays were reported in 2022.

By 2022–23 the incumbents had entered in earnest. Hero MotoCorp launched the Vida brand, having earlier invested in Ather as a hedge, TVS Motor scaled production of the iQube, which at times outsold Ather, and Bajaj Auto revived the Chetak as an electric scooter. These firms brought nationwide dealership and service networks, a weakness for start-ups that were initially confined to metropolitan cities. Some early entrants, including Okinawa and PureEV, suffered setbacks from quality problems and recalls linked to battery safety incidents, which damaged their credibility. The episode underlines that vehicle manufacturing has a steep learning curve and that brand trust is an asset that favours experienced players.

Competition has benefited buyers. New models offer removable batteries for home charging, connectivity features such as apps, GPS and anti-theft systems, and even subscription-based upgrades, while entry-level scooters that cost ₹70,000 or more a few years ago are now available in the ₹50,000–60,000 range with subsidies, and premium models commonly exceed 100 km of range. Market shares have been volatile, with Ola, Hero Electric, Ather, TVS and others trading leading positions from month to month. As early enthusiasm gives way to practical concerns, buyers are paying more attention to after-sales service, resale value and battery warranties. Incumbents have responded by training dealership mechanics for EV service and offering buyback guarantees, and some start-ups are expanding service centres and partnering with multi-brand service chains.

3.3 Localisation, supply chains and vertical integration

For manufacturers, the battery is the central strategic input, since it represents about 30–50 percent of an EV's cost. Global lithium-ion battery costs have fallen by roughly 85–90 percent since 2010 (BloombergNEF, 2023), but India imports a large share of its cells, so domestic prices also reflect import duties and exchange rates. Public policy has therefore pushed localisation. The Production-Linked Incentive (PLI) scheme for Advanced Chemistry Cell batteries, launched in 2021 with a budget of ₹18,100 crore (MHI, 2021), had by 2023 awarded about 50 GWh of capacity to four consortia, and a separate PLI scheme rewards automakers and component makers for EV production. Estimates of the benefit vary, with localised cell production reported to lower battery costs for Indian manufacturers by between roughly 8 and 20 percent, which would reduce vehicle prices by around 5–7 percent if the battery is half the

vehicle cost (CEEW, 2021). Local supply would also cushion firms against global shocks such as the mineral price spikes of 2021–22 (Kinnunen et al., 2022). Because India has very limited proven lithium or cobalt reserves, the government has also formed Khanij Bidesh India Ltd to secure overseas assets, and a 2023 announcement of an estimated 5.9 million tonnes of lithium resources in Jammu and Kashmir may eventually help, although commercial extraction is likely years away (Reuters, 2023).

Firms differ in how far they integrate. Ola Electric pursues deep vertical integration, designing its own motors and electronics, investing in a battery innovation centre and planning cell manufacturing under a PLI allocation of 20 GWh. Tata Motors draws on the wider Tata group, with Tata AutoComp for drivetrains and battery packs, Tata Chemicals working on cell chemistry and Tata Power building charging, which yields synergies within one conglomerate. Reliance Industries has moved into batteries through its acquisition of the UK sodium-ion developer Faradion and a planned integrated clean-energy complex in Gujarat. At the other end, many smaller two-wheeler start-ups adopted an asset-light model, importing cells and even kits of parts, mainly from China and Taiwan, and assembling in India. Some were criticised for effectively rebranding imports while claiming "Make in India" subsidies. Stricter enforcement of FAME localisation rules, including a 2022 investigation that delayed subsidy payments and hurt the cash flow of the manufacturers concerned (ICCT, 2024), has pushed even these firms to localise more components such as chargers, wiring and body parts. Foreign entrants face the same logic: BYD, which sells electric buses and the Atto 3 SUV in India, is reported to be exploring local manufacturing through partners to meet "Make in India" norms and avoid high import tariffs.

3.4 Partnerships and joint ventures

Because EV technology is new and still changing, collaboration has been a recurring theme. Traditional automakers have sought partners for battery chemistry, software and power electronics. Mahindra's arrangement with Volkswagen gives it access to the German firm's modular electric components for the Born Electric range (Singh, 2025), shortening development time by drawing on proven technology. Hero MotoCorp's alliance with Gogoro, the Taiwanese battery-swapping pioneer, combines Hero's market reach and manufacturing scale with a capability it lacked. Ashok Leyland has spun its EV business out as Switch Mobility, which has partnered with international players and won electric bus orders in India and the United Kingdom. Foreign manufacturers also adjust through partnership and negotiation: Tesla's renewed talks with the Indian government in 2023 about local manufacturing, though unresolved, have made incumbents wary given the firm's record of

disrupting markets through price and technology. The pattern suggests pragmatism: firms combine their own strengths in distribution, scale and customer knowledge with external technological capability instead of building everything in-house.

3.5 New business models: leasing, battery-as-a-service, swapping and conversions

Indian firms are also innovating in business models to address adoption barriers directly. Battery-as-a-service (BaaS) removes the battery, which may account for 30–40 percent of a vehicle's cost, from the purchase price and charges for it as a monthly lease or per swap. MG Motor tried this on the ZS EV in 2023–24 through a partnership with an EV financing company, cutting the upfront price by several lakh rupees; reports credit the scheme with helping MG to double its EV sales and take share from Tata (Singh, 2025), and other automakers are evaluating similar schemes.

Fleet-oriented models are growing as well. BluSmart operates large electric taxi fleets in Delhi-NCR, while Revv and Zoomcar have added EVs to self-drive rental fleets, allowing people to experience EVs without owning one. E-commerce and logistics firms, including Amazon, Flipkart and Zomato, increasingly lease EVs under service contracts that bundle maintenance and drivers, avoiding ownership risk and allowing technology refreshes as EVs improve. Amazon has committed to deploying 10,000 electric delivery vehicles in India by 2025, Mahindra supplies Treo Zor three-wheelers to its delivery network, and Tata supplies XPRES-T sedans to Uber and other aggregators. These bulk orders give manufacturers volume and predictability that individual consumer sales cannot.

Battery swapping addresses downtime and upfront cost for high-utilisation vehicles. SUN Mobility and BatterySmart are building swapping networks for e-rickshaws and e-bikes in Delhi and Bangalore, and Indian Oil is piloting swapping kiosks at fuel stations with SUN Mobility. NITI Aayog's Draft Battery Swapping Policy (2022) seeks to standardise battery formats and connectors and proposes cutting the GST on separately sold batteries from 18 percent to 5 percent. Jain et al. (2022) modelled a swapping-based e-scooter fleet in Delhi and estimated a reduction of about 15 percent in total cost of ownership per kilometre for high-utilisation users such as delivery riders, mainly through better asset utilisation and less downtime. The model remains nascent, and its scaling depends on rival manufacturers agreeing common battery specifications. A smaller trend is the retrofit market, in which start-ups convert old rickshaws or classic cars to electric drive. It is a niche for now because of regulatory and warranty hurdles, but simpler homologation could open a larger opportunity.

3.6 Convergence with energy and the role of policy

The mobility and energy sectors are converging. Energy companies such as Indian Oil, BPCL and Tata Power are entering charging and battery swapping as a natural extension of energy distribution, while automotive companies are moving into energy management; Mahindra, for example, has a solar subsidiary and has explored solar charging at dealerships. Ride-hailing firms such as Uber and Ola Cabs work with manufacturers to source EVs tailored to drivers' needs. Multi-stakeholder platforms convened by NITI Aayog and WRI India, including the e-FAST programme for freight electrification, reflect a recognition that no single sector can build the ecosystem alone (WRI India, 2025).

Policy shapes firm conduct throughout. FAME-II's localisation thresholds, the PLI schemes and battery safety norms all steer investment, and firms also react to uncertainty. FAME-II ended in March 2024 and was followed by a bridge scheme, the Electric Mobility Promotion Scheme 2024, at roughly half the per-kWh support, and then by PM e-DRIVE for 2024–26 with an outlay of ₹10,900 crore (NITI Aayog, 2025). Manufacturers with long product-development cycles prefer a policy outlook of five to ten years, and stop-start incentives complicate decisions on tooling and localisation. The ICCT (2024) recommends predictable, multi-year tapering of subsidies rather than abrupt cuts. Comparative evidence suggests that countries with sustained adoption combined integrated planning across transport, energy and industrial policy with consistency in implementation (Wappelhorst, 2021).

4. Where Consumer Behaviour and Industry Strategy Meet

Placing the two bodies of evidence side by side shows that firm strategies map closely onto the barriers that consumers report. Table 2 sets out the correspondence and notes what remains unresolved.

Table 2. Consumer barriers and corresponding firm responses

Consumer barrier	Firm or industry response	Evidence base	Unresolved question
High upfront price	Entry-priced models (Tiago EV from about ₹8.5 lakh; MG Comet at about ₹8 lakh); BaaS pricing; localised cell production	Singh (2025); CEEW (2021)	Do cost savings reach buyers? How dependent is demand on subsidy?
Range and charging access	Brand-owned scooter charging networks; removable batteries; swapping for high-use vehicles; energy firms' chargers	IBEF (2025a); Jain et al. (2022)	Interoperability and common standards; highway use by car buyers

Consumer barrier	Firm or industry response	Evidence base	Unresolved question
Battery durability and safety	Redesigned packs and thermal management after the 2022 fires; compliance with AIS norms	Section 2.3	Reputational risk from single incidents
After-sales and resale uncertainty	Dealer training for EV service; buyback guarantees; new service centres	Industry accounts	Little systematic evidence on effect on purchase
Limited choice and awareness	Rapid launches (ten Tata models planned by 2026); incumbents' dealer reach	Tata Motors (2023); Singh (2025)	Awareness gap beyond metropolitan areas
Fleet economics	Leasing and service contracts; bulk supply to logistics and ride-hailing firms	Industry accounts	Durability of fleet demand as subsidies fall

Source: Authors' synthesis.

Four observations follow. First, firms have concentrated on the barriers that consumers rank highest, price and range, and have done so with a mix of product, financing and ecosystem moves. BaaS and fleet leasing are essentially attempts to relieve the upfront price barrier without relying wholly on public subsidy, which reflects the Adepetu and Keshav (2017) finding that effective price matters more than range.

Second, the barriers rooted in trust and perception, namely battery safety, service quality and resale value, are addressed mainly through the advantages that incumbents already hold, such as brand reputation and service networks. This helps explain why established two-wheeler makers regained ground after start-ups had set the early pace, and why Singh (2025) stresses reliability over novelty. The behavioural findings that attitudes mediate other influences (Khurana et al., 2020) suggest that such trust-building is not secondary but central to turning latent interest into purchase.

Third, heterogeneity in consumer behaviour is mirrored in industry structure. Two- and three-wheeler markets, where buyers respond to total cost of ownership, are marked by intense competition among many firms and by service-based models. The car market, where buyers weigh range, performance and status, has so far been shaped by a few firms whose strategies differ by price tier. Fleet buyers form a third segment whose behaviour is closer to institutional procurement than to household choice.

Fourth, consumers and firms are linked through a feedback loop that involves infrastructure. Visible chargers raise buyers' confidence and sales, and rising sales attract

investment from firms and energy companies into further infrastructure (WRI India, 2025). Policy sits behind both sides, since incentives shape consumer demand and localisation rules shape firms' supply chains. The coming taper of subsidies will test whether the cost reductions produced by competition and localisation can substitute for public support, and therefore whether the elastic demand documented in Section 2.1 survives price rises.

These conclusions carry caveats. Much of the firm-level evidence comes from company disclosures, think-tank reports and press analysis, and market-share figures from different sources are not always consistent. The behavioural evidence includes stated-preference studies from other countries whose transferability to India is uncertain. The synthesis offered here should be read as a structured set of hypotheses informed by the literature, not as a set of tested causal claims.

5. Research Gaps and Agenda

The review points to several gaps that bear on both consumers and firms. Addressing them would also tighten the link between the two literatures.

Revealed rather than stated preferences. Many behavioural findings rest on stated-preference experiments or simulations conducted in other countries, such as the Los Angeles and German studies cited above. Indian work that uses registration and sales data, together with segment-specific samples, would show how buyers behave when they actually pay.

Under-represented consumers. Lower-income, rural, small-town and second-hand-market buyers are largely missing. Whether low-cost, short-range EVs can serve them, as European evidence hints, is an open empirical question with large implications for the scale of adoption.

Post-purchase experience. Ownership experience, including service quality, battery degradation, resale value and safety incidents, is important to trust but poorly documented. Longitudinal studies that follow owners over time could clarify how these factors influence repeat purchase and word of mouth.

Firm-level performance. Evidence on unit economics, pricing, profitability and the survival of start-ups is thin. Studies of how BaaS, leasing and swapping affect adoption, and of whether the economics hold without subsidy, are particularly needed, as are peer-reviewed analyses of vertical integration versus asset-light strategies.

Interaction of policy, firms and consumers. Few studies examine how subsidy design and tapering change both firm strategy and consumer response at once. Natural experiments created by the 2023 subsidy cut and the shift from FAME-II to later schemes offer a basis for such work, provided supply-side changes are separated from demand effects.

6. Conclusion

This review has examined the Indian EV transition through two lenses, consumer behaviour and industry dynamics. On the demand side, the evidence points to a stable core: upfront price, range, charging access and battery durability determine whether most consumers will consider an EV, while environmental attitudes, social norms and information operate largely through attitudes and matter most for urban, educated and early-adopting buyers. Demand is highly responsive to price, as the response to FAME-II subsidies and to their reduction shows, and it differs sharply by segment, with two- and three-wheelers driven by cost of ownership and cars held back by range, charging and price.

On the supply side, firms have moved from hesitation to wide commitment. Incumbent automakers and start-ups now compete in cars and two-wheelers, leading firms are localising batteries and components, partnerships connect domestic scale with foreign technology, and business models such as battery-as-a-service, fleet leasing, swapping and conversions seek to lower the barriers consumers face. In two-wheelers and cars alike, the contest has shifted from novelty to value, reliability and service.

The most important implication is that the two sides of the market cannot be understood separately. Firm strategies are, in effect, answers to consumer concerns, and consumer responses decide which strategies succeed. Whether adoption broadens beyond early adopters and fleets will depend on whether lower costs from competition and localisation, together with trust in safety and service, are in place by the time public support recedes. The research agenda set out above, centred on revealed behaviour, under-served consumers, ownership experience and firm-level economics, would help determine whether that happens, and would give policymakers and managers a firmer basis for decisions in the second half of this decade.

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