

ELECTRIC VEHICLE ADOPTION BARRIERS IN DEVELOPING ECONOMIES

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Abstract

Electric vehicles are increasingly presented as an important pathway for reducing oil dependence, local air pollution, and transport-sector emissions. Their diffusion, however, remains highly uneven across developing economies. While the technology is advancing and a wider variety of vehicles is reaching the market, adoption is constrained by conditions that are not limited to the vehicle itself. High upfront purchase prices, restricted access to affordable finance, limited charging infrastructure, uncertain electricity service, weak after-sales networks, policy instability, and uneven consumer trust often combine to make an electric vehicle appear financially or practically risky. The same barrier can operate differently for households, small enterprises, fleet operators, informal transport workers, and public transport agencies.

This paper examines the barriers that shape electric vehicle adoption in developing economies through a structured review and conceptual analysis. It organizes the literature into five interconnected domains: economic and financing constraints; charging and electricity-system readiness; vehicle technology, maintenance, and service capability; policy, regulatory, and market coordination; and social, behavioural, and informational factors. The analysis treats adoption as a system-level decision rather than a simple consumer preference. A buyer's willingness to choose an electric vehicle depends not only on purchase cost and driving range, but also on the availability of dependable charging, warranty support, repair services, resale options, insurance, and credible policy signals.

The review indicates that affordability is frequently the most visible barrier, but it is rarely isolated. Limited access to loans, leasing, battery financing, and risk-sharing arrangements can prevent consumers from acting on potential lifetime savings. Charging gaps are especially consequential where homes lack private parking, electricity supply is unreliable, public chargers are scarce, or distribution networks are not prepared for concentrated demand. In addition, uncertainty about battery life, repair costs, safety, and second-hand value can make conventional vehicles appear less risky even when their operating costs are higher.

The paper concludes that developing economies require context-sensitive electric-mobility strategies. Effective policy should combine targeted financing, reliable and inclusive charging access, appropriate vehicle segments, consumer protection, technical standards, workforce development, and stable implementation arrangements. Rather than relying only on purchase subsidies, decision makers should identify high-value use cases such as two- and three-wheelers, urban buses, delivery fleets, and shared mobility, while protecting affordability and user choice. The findings offer a practical framework for researchers, governments, financiers, utilities, manufacturers, and transport agencies seeking to accelerate an equitable transition to electric mobility.

Keywords: Electric Vehicles, Developing Economies, Charging Infrastructure, Affordability, Transport Transition, Consumer Adoption, Electric Mobility Policy, Battery Technology, Energy Access, Sustainable Transport

1. INTRODUCTION

Electric mobility is becoming an increasingly important element of transport and energy planning. Battery-electric and plug-in vehicles can reduce direct tailpipe emissions, diversify energy use, and create new opportunities for local manufacturing, digital services, and

distributed energy integration. Yet the pace of adoption differs considerably across countries. In many developing economies, the conditions that influence vehicle choice are shaped by lower purchasing power, high borrowing costs, informal employment, limited parking, congested cities, uneven electricity supply, and

constrained public investment. These conditions mean that a policy or business model that works in a high-income market may not transfer directly to a lower- or middle-income setting.

The term electric vehicle adoption refers to more than the purchase of a private car. It includes decisions by households, commercial fleets, transport operators, public agencies, delivery platforms, and small businesses. It also includes the use of electric two-wheelers, three-wheelers, buses, light commercial vehicles, and passenger cars. Each segment has different duty cycles, charging patterns, capital requirements, and revenue models. A vehicle that is attractive for a predictable urban delivery route may not be suitable for a family that needs occasional long-distance travel and lacks home charging. Therefore, the barriers to adoption must be examined in relation to the user, the vehicle segment, the energy system, and the local mobility ecosystem.

High upfront cost is one of the most commonly reported obstacles. Even when an electric vehicle offers lower fuel and maintenance costs over its operating life, buyers often make decisions under immediate budget constraints. The availability of loans, leasing, credit guarantees, battery-rental models, insurance products, and resale markets can strongly influence whether the initial investment is considered manageable. For small operators and informal workers, the ability to make daily or weekly payments may be more important than a projected life-cycle saving that is difficult to verify or finance.

Charging availability is another central issue. Public charging networks require coordinated planning across utilities, municipal authorities, property owners, fuel retailers, fleet depots, and private providers. In many urban areas, households live in apartments or rented accommodation without designated parking, while local distribution grids may have limited capacity for fast charging. In rural and peri-urban areas, distance, grid reliability, and service access can be more important than the absolute number of chargers. The adoption decision is therefore influenced by whether charging is dependable, visible, affordable, compatible with local payment systems, and located where users actually stop or work.

Technology confidence, policy credibility, and social acceptance also matter. Consumers may be uncertain about driving range, battery durability, repair availability, flood or heat performance, safety, and future resale value. Dealers and independent mechanics may lack the equipment or training needed to service electric vehicles. At the same time, policies can be difficult to interpret when incentives change frequently, charging standards are unclear, import duties are inconsistent, or electricity tariffs make operating costs unpredictable. The objective of this paper is to identify the main barriers to electric vehicle adoption in developing economies and to develop a practical framework for reducing them through coordinated policy, finance, infrastructure, and market design.

2. LITERATURE REVIEW

Early studies of electric vehicle adoption often focused on consumer preferences for vehicle price, driving range, charging time, performance, and environmental benefits. This work remains essential because buyers compare electric vehicles with established internal-combustion alternatives that are familiar, repairable, and supported by existing fuel networks. Subsequent research expanded the analysis to include social influence, perceived risk, charging convenience, policy incentives, and the availability of complementary services. The literature increasingly recognizes that adoption is shaped by both the characteristics of a vehicle and the characteristics of the wider socio-technical system in which it is used.

Research on developing economies emphasizes the importance of structural conditions. Consumers may face higher credit constraints, limited formal insurance, fragmented used-vehicle markets, and a larger share of informal or self-employed transport work. Public charging investment can be difficult to finance when utilization is initially low, while limited charging availability can discourage vehicle purchases. This interaction is often described as a coordination or chicken-and-egg problem: vehicle demand is constrained by infrastructure, but infrastructure investors hesitate when the vehicle base is small. Electricity reliability, apartment living, land availability, and

municipal approval processes can make the coordination problem more severe.

Recent studies also caution against treating developing economies as a single market. The relative importance of barriers differs by country, city, income group, vehicle segment, and travel pattern. For example, electric two-wheelers and three-wheelers may become viable sooner where trips are short and battery

swapping is practical, while buses can benefit from depot charging and predictable routes. By contrast, private passenger vehicles may face more persistent affordability and home-charging constraints. The literature therefore supports a segmented approach that links policy instruments with local use cases, financial conditions, and grid capacity.

Table 1: Summary of Key Literature on Electric Vehicle Adoption Barriers

S. No.	Author(s) / Year	Barrier / Theme	Study Context	Key Contribution
1	Egbue & Long (2012)	Consumer perceptions	Vehicle adoption	Identifies price, range, charging access, and uncertainty as recurring barriers to wider EV acceptance.
2	Rezvani, Jansson & Bodin (2015)	Adoption research review	Consumer behaviour	Shows that financial, technical, psychological, and policy variables jointly shape adoption decisions.
3	Sierzechula et al. (2014)	Incentives and market conditions	Cross-country EV markets	Highlights the role of fiscal incentives, charging availability, and broader socio-economic conditions.
4	Liao, Molin & van Wee (2017)	Consumer preferences	Literature review	Synthesizes preference evidence on cost, range, charging, environmental values, and policy attributes.
5	Hardman et al. (2018)	Charging experience	Charging infrastructure	Explains how convenience, reliability, access, and user interaction with charging systems influence adoption.
6	Kumar & Alok (2020)	Sustainability and adoption	Global literature review	Identifies interlinked economic, technological, infrastructure, and institutional determinants of EV uptake.
7	Krishna (2021)	Thematic barrier analysis	Consumer adoption	Organizes barriers around cost, range, charging, policy, awareness, and technology confidence.
8	Chhikara et al. (2021)	Adoption determinants	India	Finds that consumer concerns about cost, performance, awareness, and infrastructure affect adoption intentions.
9	Jaiswal et al. (2021)	Behavioural intention	Indian sustainable transport	Links perceived value, social influence, environmental concern, and facilitating conditions with purchase intention.
10	Tarei, Chand & Gupta (2021)	Barrier prioritization	India	Provides evidence that policy, infrastructure, technological, and market barriers require coordinated responses.
11	World Bank (2026)	Finance and risk allocation	Low- and middle-income countries	Emphasizes the importance of finance, public transport applications, and country-specific market development.
12	Lin et al. (2025)	Multi-dimensional barriers	Cambodia, Myanmar, Philippines	Compares economic, infrastructural, technological, policy, and social barriers across emerging ASEAN

				economies.
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3. OBJECT OF STUDY

The object of this study is the adoption of electric vehicles in developing economies viewed as a multi-dimensional transition problem. The analysis focuses on the gap between potential demand for electric mobility and the conditions required for users to make, sustain, and benefit from an adoption decision. It considers both private and commercial users, while recognizing that passenger cars, two-wheelers, three-wheelers, buses, and delivery fleets may face different economic and operational conditions.

The study examines how affordability, charging access, electricity reliability, vehicle performance, after-sales service, financing, regulation, and social perceptions interact. The core premise is that adoption cannot be explained only by environmental preference or the stated price of a vehicle. A prospective user also evaluates whether the vehicle can be charged at the right time, repaired locally, insured, resold, financed, and used without creating excessive disruption to work or household mobility.

In addition, the study considers the institutional arrangements that influence the adoption environment. These include purchase incentives, tax treatment, import rules, charging standards, electricity tariffs, land and permitting arrangements, utility planning, battery warranty rules, consumer-protection measures, and public procurement. The aim is to identify a framework that supports practical

and equitable electric-mobility decisions rather than isolated sales growth.

KEY POINTS OF OBJECT OF STUDY

- To examine how upfront vehicle price, total cost of ownership, and access to credit influence electric vehicle decisions.
- To analyse the role of public, workplace, depot, home, and battery-swapping infrastructure in daily vehicle use.
- To assess how electricity reliability, distribution-grid capacity, tariffs, and payment systems shape charging confidence.
- To investigate concerns related to range, battery life, charging time, safety, repairability, and resale value.
- To evaluate the role of dealers, technicians, spare-parts supply, warranties, insurance, and after-sales support.
- To compare adoption barriers across private users, commercial fleets, public transport agencies, and informal operators.
- To study the influence of incentives, standards, import rules, local manufacturing policy, and regulatory consistency.
- To consider public awareness, peer influence, environmental values, risk perceptions, and trust in new technology.
- To identify equity risks for renters, low-income users, women, small enterprises, and communities without private parking.
- To develop a context-sensitive framework for policy and market design in developing economies.

Table 2: Object of Study Framework

S. No.	Study Component	Description	Purpose
1	Affordability and Finance	Purchase price, credit access, leasing, battery finance, insurance, and resale value.	Assess whether users can manage the initial and continuing financial risks of EV ownership.
2	Charging and Electricity System	Public, home, workplace, depot, and swapping access; grid reliability; tariffs; payment systems.	Identify whether charging can support daily travel and commercial operations.
3	Vehicle Technology and Performance	Range, charging time, battery health, safety, climate performance, and service requirements.	Understand technology-related uncertainty and operational fit.
4	After-Sales and Market Ecosystem	Dealers, repair networks, spare parts, diagnostics, warranties,	Examine confidence in maintenance, downtime reduction,

		and recycling arrangements.	and ownership continuity.
5	Policy and Regulatory Environment	Incentives, taxes, standards, permits, utility regulation, procurement, and enforcement.	Evaluate whether market signals are stable, transparent, and coordinated.
6	User and Segment Characteristics	Income, occupation, trip patterns, parking access, fleet size, and daily vehicle use.	Recognize differences between households, fleets, public agencies, and informal operators.
7	Social and Informational Context	Awareness, social norms, trusted information, environmental values, and perceived status.	Explain how knowledge and peer experience affect acceptance.
8	Inclusive Mobility Outcome	Affordability, access, reliability, safety, and distribution of benefits across user groups.	Connect adoption with equitable and sustainable mobility outcomes.

4. RESEARCH METHODOLOGY

This paper uses an explanatory and integrative review design. It does not collect a new survey or estimate a single country-level adoption model. Instead, it synthesises peer-reviewed studies, policy reports, institutional assessments, and established analyses of electric mobility. This approach is appropriate because the research question concerns how multiple barriers interact across different developing-economy contexts, vehicle segments, and mobility systems.

The review is organized around five analytical domains: economic and financing conditions; charging and electricity-system readiness; vehicle technology and after-sales capability; policy and regulatory coordination; and social or behavioural influences. Sources are considered for the type of user or market they address, the barrier studied, the geographical setting, the method used, and the practical implication for policy or market design. Particular attention is given to evidence that distinguishes a short-term increase in vehicle sales from sustained, reliable, and inclusive adoption.

To preserve conceptual clarity, the paper distinguishes between adoption intention, vehicle purchase, actual use, and long-term retention. A favorable survey response does not necessarily result in a purchase if credit is unavailable or charging is impractical. Similarly, a rise in sales does not demonstrate a successful transition if users face downtime, high operating costs, lack of repair support, or difficulty reselling vehicles. The analysis therefore treats electric mobility as a

coordinated transition involving vehicles, infrastructure, energy services, finance, and users.

4.1 RESEARCH DESIGN

- Study Type: Explanatory and literature-based research.
- Approach: Integrative review and conceptual synthesis.
- Unit of Analysis: Electric-vehicle adoption decisions by households, firms, fleets, public agencies, and transport operators.
- Primary Barrier Domains: Affordability, charging access, electricity reliability, technology confidence, after-sales support, policy, and social acceptance.
- Context Variables: Income, credit access, urban form, parking access, travel patterns, grid conditions, regulatory capability, and vehicle segment.
- Outcome Variables: Purchase intention, adoption, charging use, operational reliability, retention, and equitable access.
- Ethical Position: No personal or human-subject data were collected for this study.

4.2 METHODOLOGICAL STEPS

- Step 1: Define electric vehicle adoption as a decision that includes purchase, charging access, operating reliability, and long-term use.
- Step 2: Identify the major economic, infrastructure, technology, policy, and social barriers described in the literature.
- Step 3: Review evidence from developing economies while drawing carefully on broader international adoption research where relevant.

- Step 4: Classify findings by user segment, including private users, shared mobility, commercial fleets, public transport, and small operators.
- Step 5: Compare evidence on vehicle cost, finance, charging access, electricity service, repairability, and regulatory conditions.
- Step 6: Interpret findings in relation to local income levels, land use, grid capacity, institutional capability, and transport needs.
- Step 7: Identify limitations, including cross-country differences and the risk of applying evidence from high-income markets without adaptation.
- Step 8: Develop policy and market-design implications that support reliable, affordable, and inclusive adoption.

5. DATA ANALYSIS

The data analysis is based on qualitative synthesis of the reviewed literature. The evidence is interpreted by tracing how a particular barrier changes the likelihood that a user will consider, purchase, charge, operate, or retain an electric vehicle. The analysis does not present newly collected numerical observations. Instead, it consolidates recurring patterns and identifies the conditions under which those patterns become more or less important.

Across the reviewed sources, the most consistent message is that electric vehicle adoption depends on the practical fit between a vehicle and a user's everyday mobility system. A lower operating cost is not sufficient when the upfront payment is unaffordable, charging is uncertain, or repairs create long periods of lost work. Conversely, adoption can become viable when a vehicle has a predictable route, adequate daily utilization, accessible charging, a dependable financing arrangement, and local service support. The following sections organize the analysis around four closely related barrier groups.

5.1 AFFORDABILITY, FINANCING, AND OWNERSHIP RISK

Affordability is commonly framed as the difference between the purchase price of an electric vehicle and that of a conventional vehicle. In developing economies, however, affordability is broader than the sticker price. It includes the size and timing of the down

payment, interest rates, access to formal credit, insurance premiums, battery warranty conditions, replacement risk, and the ability to resell the vehicle. Buyers with irregular income may be particularly sensitive to cash-flow timing. Even a financially attractive vehicle over several years can remain out of reach when a household or small operator cannot absorb the initial payment or qualify for a loan.

The total cost of ownership can be favorable for high-utilization applications, especially where electricity is competitively priced and fuel expenses are substantial. However, users may not trust projected savings when they lack experience with battery durability, servicing costs, or residual value. Lenders can face the same uncertainty. If they cannot reliably value a used electric vehicle or recover it after default, they may require high collateral or offer shorter loan terms. This creates a financial risk premium that makes adoption harder precisely for users who could benefit most from lower daily operating costs.

Financing design is therefore a core adoption instrument rather than a secondary support measure. Leasing, battery-as-a-service, concessional loans, credit guarantees, pay-per-use arrangements, and fleet contracts can reduce the burden of upfront ownership. These instruments must be transparent and appropriate for the income pattern of the user. A poorly designed payment schedule can increase financial stress, while a subscription model with unclear fees can weaken trust. Public support is most useful when it reduces a genuine market failure, such as early-stage credit risk or charging-investment uncertainty, rather than simply lowering prices for users who would have purchased anyway.

KEY OBSERVATION:

- High upfront cost is amplified by limited credit, high interest rates, uncertain residual value, and informal employment.
- Potential life-cycle savings do not automatically solve a cash-flow or collateral constraint faced by households and small operators.
- Finance products should match vehicle use, income volatility, warranty protection, and the ability to manage unexpected costs.

5.2 CHARGING INFRASTRUCTURE, ELECTRICITY RELIABILITY, AND URBAN FORM

Charging access is often discussed in terms of the number of public charging points. While charger counts are important, practical access depends on location, reliability, compatibility, waiting time, price, payment method, safety, and operating hours. A charging point that is far from a user's route, frequently unavailable, or difficult to pay for may not reduce range anxiety. For commercial users, the key question is whether charging can be incorporated into a work schedule without creating expensive downtime. For households, the question is often whether charging is possible near home or in a routine destination such as work, school, or a local market.

Housing and parking conditions are especially important in developing cities. Many residents live in apartments, rented homes, informal settlements, or dense neighbourhoods without private off-street parking. Installing a private charger may require landlord approval, electrical upgrades, or building-management coordination that is difficult to obtain. Public charging becomes essential for these users, yet public sites also require land, permits, distribution connections, and a viable business model. If charging is concentrated only in affluent areas or major commercial corridors, access can become uneven and exclude users who do not have secure home charging.

Electricity reliability and local grid conditions can strengthen or weaken confidence in electric mobility. A vehicle may be technically suitable, but adoption will be difficult if outages are common, service quality is poor, or charging tariffs are unpredictable. Utilities need to plan for load growth, connection timing, transformer capacity, and opportunities for managed charging. In some contexts, battery swapping, depot charging, solar-supported charging, or scheduled overnight charging may be more practical than a uniform network of high-power public chargers. The appropriate solution depends on the vehicle segment, travel distance, land availability, and grid characteristics.

Key Observation:

- Charging access should be measured through usability and reliability, not only through the number of chargers installed.

- Renters, apartment residents, and users without dedicated parking require inclusive public or shared charging solutions.
- Charging strategy must be coordinated with local grid capacity, tariffs, operating schedules, and vehicle duty cycles.

5.3 TECHNOLOGY CONFIDENCE, AFTER-SALES SERVICE, AND MARKET READINESS

Technology concerns arise when buyers have limited direct experience with electric vehicles. Driving range, battery life, charging time, thermal performance, flood exposure, safety, and software reliability can all influence perceived risk. These concerns are not merely informational. They are connected to the practical ability to repair a vehicle, obtain spare parts, receive warranty service, and verify battery condition. A customer may accept a new technology when a trusted dealer, mechanic, or fleet manager can explain how it works and provide support if a problem occurs.

After-sales capability is particularly important for commercial users whose income depends on vehicle availability. A delivery rider, taxi driver, or small logistics firm may not be able to tolerate extended downtime while waiting for a specialist part or technician. The absence of trained service staff can therefore increase the perceived cost of adoption even when the vehicle itself is reliable. Manufacturers, dealers, technical institutes, independent workshops, and insurers all have roles in building market confidence. Standardized diagnostics, accessible spare parts, transparent warranties, and technician training can reduce uncertainty as effectively as some financial incentives.

Market readiness also includes battery end-of-life management and safety governance. Users need clear information on warranty coverage, battery health, recycling or second-life options, and the procedure for handling damaged components. In hot, humid, flood-prone, or poorly maintained environments, trust depends on whether products are designed for local conditions and whether safety claims can be verified. A transition that overlooks repairability and end-of-life responsibility may create new risks for consumers and local authorities.

KEY OBSERVATION:

- Technology concerns are reduced when users can access trusted warranties, trained technicians, diagnostics, spare parts, and clear repair procedures.
- After-sales support is an operational requirement for fleets and informal workers, not only a customer-service feature.
- Local climate, road conditions, safety standards, and battery end-of-life arrangements affect long-term confidence.

5.4 POLICY COORDINATION, REGULATION, AND CONSUMER TRUST

Policy support is frequently associated with purchase subsidies, tax exemptions, or registration benefits. Such measures can help reduce the initial cost gap, but they are not sufficient on their own. Adoption also depends on whether charging regulations are clear, electricity tariffs are understandable, standards are interoperable, import and manufacturing rules are predictable, and permits can be obtained in a reasonable time. When policies change without notice or differ across agencies, households and investors may delay decisions because they cannot estimate future costs or legal requirements.

A coordinated policy framework connects transport, energy, finance, urban development, environment, industry, and consumer protection. For example, a charging rollout may require municipal land approval, utility connections, electricity pricing rules, building codes, safety requirements, and payment-system integration. Similarly, public procurement of buses may need financing, depot upgrades, maintenance contracts, driver training, and electricity supply planning. Fragmented governance can turn each of these tasks into a separate bottleneck, while a coordinated approach can reduce uncertainty and allocate responsibility clearly.

Consumer trust depends on transparency as well as incentives. Buyers should be able to compare prices, charging costs, warranties, battery coverage, service terms, and financing conditions. Misleading claims, hidden charges, or poor service after purchase can weaken the reputation of the entire market. Public information campaigns are most credible when they are linked to practical demonstrations,

independent data, and visible service arrangements rather than only promotional messages. Peer experience can be especially influential when first adopters are local fleet operators, transport workers, or community institutions that potential users already trust.

KEY OBSERVATION:

- Stable, coordinated rules are as important as financial incentives because users and investors need confidence in future operating conditions.
- Transport, electricity, finance, urban planning, and consumer-protection institutions must work together to reduce adoption friction.
- Transparent prices, warranties, charging terms, and service standards are essential for public trust in early-stage EV markets.

6. DISCUSSION

The reviewed evidence demonstrates that electric vehicle adoption in developing economies is best understood as a coordination problem across users, infrastructure, energy services, finance, and institutions. A single intervention can help, but its effect may be limited when complementary conditions are absent. A purchase incentive, for example, may increase interest but will not resolve the difficulty of charging in dense rental housing. A public charging network may remain underused when financing is unavailable or vehicle models are too expensive. Similarly, a technically capable vehicle may not be adopted if repair services and warranties are unclear. Policy therefore needs to address barrier bundles rather than isolated obstacles.

Segmented deployment offers a more practical route than a uniform, car-first strategy. Electric two-wheelers and three-wheelers can be attractive where trips are short, operating costs are high, and battery swapping or destination charging is feasible. Urban buses and delivery fleets may benefit from fixed routes, centralized procurement, and depot-based charging. Shared mobility and commercial fleets can also create early utilization for charging infrastructure. Private passenger cars remain relevant, but their adoption may depend more heavily on home charging, consumer credit, and confidence in the second-hand market. The appropriate sequencing should reflect local travel demand,

income patterns, road conditions, and grid capacity.

Equity should be treated as a design requirement. If charging access is concentrated only in high-income neighbourhoods, or incentives mainly support users who can afford new vehicles, electric mobility may widen existing inequalities. Renters, apartment residents, informal workers, small enterprises, and communities with weaker electricity service may be left out of the transition. Inclusive design can include shared charging, flexible finance, targeted support for commercial livelihoods, public transport electrification, transparent tariffs, and participation by local governments and community organizations. The goal is not merely to maximize vehicle sales; it is to improve access to reliable, affordable, and lower-emission mobility.

The discussion also highlights the importance of evaluating outcomes beyond early registrations. Researchers and policy makers should examine vehicle utilization, charging reliability, downtime, operating costs, default rates, repair access, user satisfaction, battery health, and distributional effects. A successful program should help users complete trips and sustain livelihoods without exposing them to excessive financial or operational risk. This requires longitudinal evidence and clear data governance, particularly where digital charging platforms and financing systems collect user information.

Finally, developing economies may benefit from treating electric mobility as part of a broader energy and industrial strategy. Local assembly, technical training, battery management, renewable-energy integration, and recycling can create domestic capability, but only when market demand and standards are credible. The transition should be paced realistically. Premature mandates without charging, finance, or service support can undermine trust, while carefully targeted pilots

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can demonstrate what works and build an evidence base for scale.

7. CONCLUSION

This paper examined electric vehicle adoption barriers in developing economies through an integrated framework. The analysis shows that high purchase prices, restricted financing, limited charging access, uncertain electricity service, technology concerns, weak after-sales networks, fragmented policy, and uneven public trust often operate together. These barriers explain why the availability of electric vehicles alone does not guarantee broad adoption. The decision to switch is shaped by whether a user can finance, charge, service, insure, and confidently use the vehicle within everyday mobility and work requirements.

The review indicates that affordability must be addressed through more than purchase subsidies. Credit guarantees, leasing, battery-finance models, fleet contracts, transparent insurance, and credible warranty arrangements can reduce perceived risk. Charging policy must prioritize dependable and inclusive access, especially for users without private parking. Technical standards, technician training, repair ecosystems, and battery end-of-life arrangements are also necessary to create confidence in long-term ownership and operation.

The paper concludes that the most effective electric-mobility strategies will be targeted, coordinated, and context-sensitive. Governments and market participants should identify vehicle segments with clear operational advantages, coordinate infrastructure with electricity-system planning, protect consumers, and use stable policies to reduce uncertainty. Future research should compare adoption pathways across cities, rural areas, income groups, vehicle categories, and business models, with greater attention to equity, battery reuse, grid impacts, and long-term user outcomes.

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