ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug418

A Study on how Partnerships in Hyper Local Charging Infrastructure can Impact the Sales Performance of Electric Two Wheelers

Anjitha B Nair[1]

[1]Assistant Professor, Department of Commerce, Christ Nagar College Maranalloor

Publication Date 2025/08/19

Abstract: The increase of electric two-wheelers (E2Ws) in India isn't just about the latest know-how; it is also particularly tied to how easily people can access charging stations. This study joints into how partnerships can help create local charging infrastructure and influence these alliances have on E2W sales. As cities grow and the demand for convenient last-mile transportation increases, local charging options—like those set up in residential areas, shops, and workplaces—are becoming necessary for improving E2W adoption. Public-private partnerships (PPPs), which involve cooperation between manufacturers, charging service providers, and local businesses, are critical for speeding up the rollout of this infrastructure. The research uses a mixed-methods style, looking at existing data and gathering insights from E2W users and stakeholders in the Trivandrum district. The results show a strong optimistic connection between easy access to local charging and consumer confidence, which in turn drives up E2W sales. The study highlights the importance of establishing planned partnerships and having supportive policies to increase local infrastructure and encourage sustainable urban mobility.

Keywords: *Electric Two-Wheelers (E2Ws), Electric Vehicles (EVs), Hyper-Local Charging Infrastructure, Public-Private Partnerships (PPPs), Charging Stations, EV Adoption, Sustainable Urban Mobility, Range Anxiety, Battery Swapping, Renewable Energy Integration, Grid Integration, Charging Service Providers, Local Businesses, Consumer Confidence, Charging Availability, Charging Pricing Strategies, Infrastructure Development, Government Policies and Incentives, Collaboration Models, Urban Mobility, Rural Mobility*.

How to Cite: Anjitha B Nair (2025) A Study on how Partnerships in Hyper Local Charging Infrastructure can Impact the Sales Performance of Electric Two Wheelers. *International Journal of Innovative Science and Research Technology*, 10(8), 588-592. https://doi.org/10.38124/ijisrt/25aug418

I. INTRODUCTION

Electric vehicles (EVs) are becoming more popular, thanks to their positive impact on the environment, cost savings, and decreased dependence on oil. Essential technologies like electric motors, battery systems, charging infrastructure, and smart controls are vital for boosting the sustainability and reliability of EVs. To encourage more people to adopt EVs, we need to develop efficient charging infrastructure, which includes smart charging, vehicle-to-grid (V2G) systems, solar-powered charging, and on-the-go charging solutions. Moreover, improvements in power management, safety, and grid integration are necessary to enhance efficiency and reliability. A user-friendly and extensive charging network is crucial for facilitating the shift to e-mobility and making the most of renewable energy resources.

In the fast-evolving world of automobiles, India's strong EV infrastructure has the potential to redefine how we move. Yet, this exciting journey is not without its challenges, particularly the lack of sufficient charging stations, which is holding back the growth of electric vehicles. To truly grow India’s electric vehicle (EV) market, we need a strong and sustainable charging infrastructure. These chargers came from EV manufacturers and were acquired by public sector units, commercial fleet operators, bus companies, and charging service providers.

India's transportation sector is grappling with some serious issues, like traffic jams, crumbling infrastructure, and a public transport system that just isn't cutting it Raghav Bharadwaj (2023). These problems are costing the country a staggering $22 billion each year in lost productivity and wasted fuel. On top of that, the post-pandemic economic slowdown, rising inflation, and high borrowing costs are putting even more pressure on the automotive industry, while the transition to electric vehicles brings its own set of uncertainties.

Transportation is also a major contributor to pollution, accounting for 18% of India’s energy consumption (94 MTOE) and releasing harmful pollutants such as PM2.5, NOx, and VOCs. In fact, 10 of the world's most polluted

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug418

cities are right here in India. To align with the Paris Agreement, India is aiming for a 30% adoption rate of electric vehicles by 2030, along with a 33-35% reduction in GDP emissions intensity and a significant increase in renewable energy capacity to 450GW, up from just 82.6GW today.

However, despite this promising growth, there are still several hidden challenges that stand in the way of transforming mobility. Issues like a shortage of charging stations and poor coordination among stakeholders are significant hurdles. Additionally, the high costs associated with setting up charging stations and expanding the electricity grid adds to the complexity of the situation

The world is really moving towards sustainable mobility, and this shift has led to a surge in electric vehicles (EVs), with electric two-wheelers (E2Ws) becoming a standout option, especially in crowded urban and suburban areas. But there's a significant hurdle to overcome: the lack of accessible and dependable charging infrastructure. Unlike electric cars that often depend on centralized charging stations, E2W riders usually need hyper-local charging solutions because of their smaller batteries and the need for more frequent charging. This study dives into how strategic partnerships in hyper-local charging infrastructure can impact E2W sales, filling an important gap in both research and industry practices.

Hyper-local charging infrastructure means having small, decentralized charging points set up in neighborhoods, commercial areas, and public spaces. This setup not only offers convenience but also helps ease range anxiety for E2W users. While both public and private sectors have tried to expand charging networks, the scalability and efficiency of these systems are still limited without collaboration. By teaming up, E2W manufacturers, charging providers, local businesses, and city authorities can create a more integrated and seamless ecosystem. This study aims to explore how these partnerships in developing charging infrastructure can boost consumer confidence and ultimately drive E2W sales.

The rise of electric two-wheelers (E2Ws) in places like India, China, and Southeast Asia really shows how crucial it is to have affordable and accessible charging options. In these areas, collaborations with local stores, apartment complexes, and ride-hailing services are starting to bridge the infrastructure gap. Yet, we still don't fully understand how these partnerships directly influence E2W sales. This research aims to measure how hyper-local charging networks affect consumer buying habits, taking into account factors like charging availability, pricing strategies, and overall user experience. As the Indian EV charging infrastructure keeps evolving, both the government and private companies are pouring resources into expanding charging networks. Their goal is to build a strong ecosystem for electric two-wheelers (E2Ws) across the nation

Moreover, this study looks into various partnership models—like those led by manufacturers, third-party aggregators, and community-driven solutions—to figure out which ones are the most effective in promoting E2W adoption. By diving into case studies and market data, the research will offer practical insights for policymakers, industry players, and investors who want to enhance charging infrastructure strategies. The results could help shape policies that encourage partnerships, ultimately speeding up the shift towards electric mobility.

In the end, the study highlights the interconnectedness of charging infrastructure and E2W sales, stressing that as we innovate vehicles, our infrastructure needs to keep pace. With governments around the globe pushing for electrification to meet climate targets, grasping the significance of hyper-local partnerships is vital. This research adds to the larger conversation about sustainable transportation by showing how collaborative infrastructure solutions can break down barriers to adoption, boost market growth, and lead us toward a cleaner, electric future.

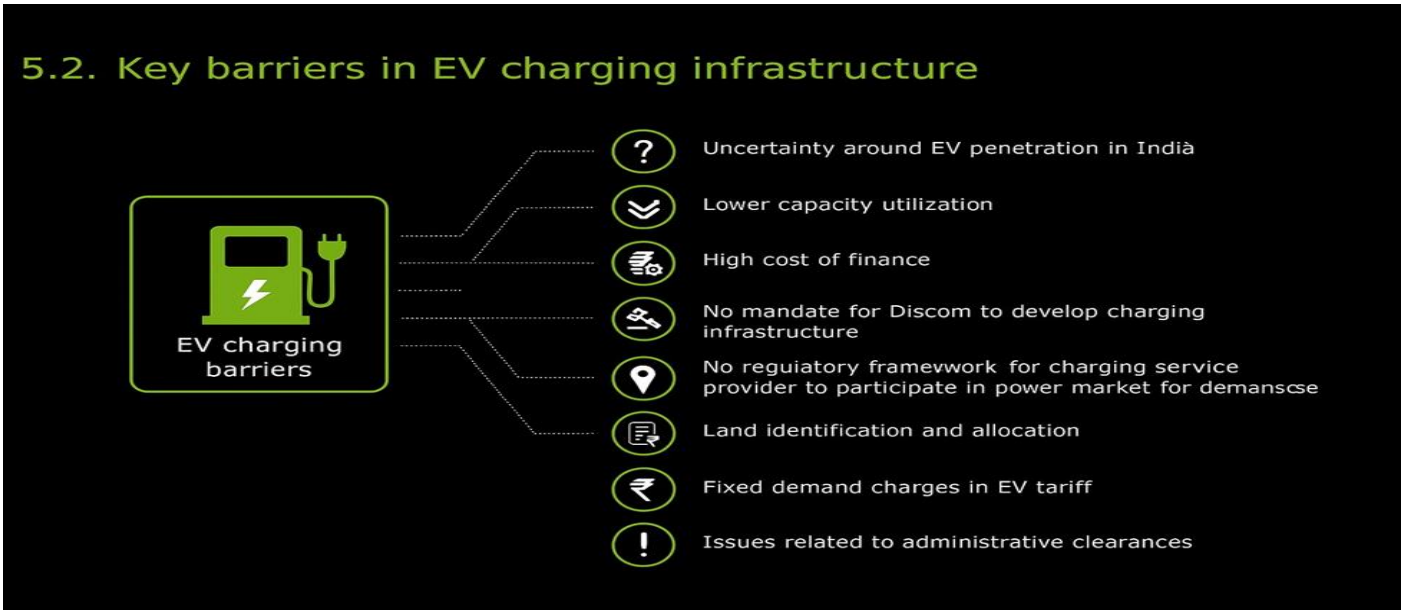

Fig 1 Key Barriers in EV Charging Infrastructure

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug418

➢ *Objectives of the Study*

- To study how partnerships between electric two-wheeler manufacturers and hyperlocal charging infrastructure providers impact the availability and convenience of charging facilities.
- To estimate the direct effect of hyperlocal charging infrastructure on the sales performance of electric two-wheelers.
- To investigate consumer perception regarding the accessibility of charging stations and its effect on their decision to purchase electric two-wheelers.
- To identify successful case studies of partnerships in hyperlocal charging networks and assess their outcomes in terms of increased E2W sales.
- To suggest strategic recommendations for enhancing sales performance through effective partnerships in charging infrastructure.

➢ *Main Paper*

India's Ministry of Power has set a goal to establish a charging station every 25 kilometers along highways, aiming for a total of 11,596 stations. However, as it stands, only 1,742 are currently in place, with the majority found in urban centers like Delhi, Mumbai, and Bengaluru. This uneven distribution reveals a significant shortfall in EV infrastructure for rural areas, even though cities have a greater potential for electric vehicle adoption. As a result, rural regions are left in the lurch, lacking the necessary support for EV growth.

➢ *The EV Revolution: Expanding Public Charging Infrastructure to Meet Growing Demand*

- *The Rapid Rise of the EV Market*

The electric vehicle (EV) revolution is picking up speed faster than we ever imagined, with projections suggesting that by 2035, EVs could make up about half of all vehicles in major European markets. Initially, it's been high-income early adopters—those who can charge at home—who have fueled this growth. However, for EVs to truly take off, we need a strong public charging infrastructure to cater to those without off-street parking. Surveys indicate that the lack of charging stations is the second-largest barrier for potential EV buyers, just behind the initial purchase costs Charlie Simpson and Edward Sullivan (2023).

- *Questions about Future Charging Preferences and Infrastructure Needs*

As the EV market transitions from early adopters to a broader audience, several important questions arise regarding charging speed preferences, urban versus rural demand, and the balance between battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs). While slower chargers may be more common in residential areas, there's likely to be an increasing demand for rapid and destination charging options, such as those found at shopping centers or along highways. However, the ideal combination of slow, rapid, and ultra-rapid chargers is still uncertain, highlighting the need for adaptable infrastructure planning. Deutsche Gesellschaftfür Internationale Zusammenarbeit (GIZ) GmbH and in cooperation with NITI AYOG.

- *Working Together to Expand Charging Infrastructure*

For electric vehicles (EVs) to truly take off, everyone involved—governments, charge point operators (CPOs), car manufacturers, and investors—needs to join forces to tackle the challenges in building out the necessary infrastructure. Here are some key strategies to consider:

✓ *Maximizing Returns for Investors:*

Choosing the best locations, developing smart pricing models, and exploring additional revenue opportunities (like advertising). Cutting down on installation and operational expenses by buying hardware in bulk and planning the grid efficiently. Finding favorable financing options to reduce capital costs and boost returns.

✓ *Ensuring Top-Notch Operations for CPOs:*

Maintaining clear brand identity by focusing on specific types of chargers and locations. Building a resilient supply chain and ensuring network reliability to keep customer trust intact.

✓ *Strengthening Partnerships across the Ecosystem:*

Governments should step up with funding (like rapid charging initiatives) and simplify permitting processes to speed up deployment.

Car manufacturers (OEMs) ought to share insights about consumer behavior to better align charging infrastructure with what users need. Renewable energy providers can set up generation assets alongside charging stations, helping to lower electricity costs.

Low EV sales are making it tough to get more charging stations built, which in turn makes people hesitant to adopt EVs. To tackle this, the research points to charging station subsidies as a potential policy solution.

II. FINDINGS OF THE STUDY

➢ *Rising Popularity of PEVs –*

Plug-in electric vehicles (PEVs) are becoming increasingly popular in India, thanks to their low CO_2 emissions, easy maintenance, and lower operating costs.

➢ *Significance of Charging Infrastructure –*

A strong and well-established charging infrastructure is crucial for the ongoing growth of the electric vehicle market in India.

Strong charging networks are essential since India relies heavily on road transport. Shared charging solutions can tackle challenges like the shortage of charging stations, range anxiety, and lengthy charging times.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug418

- *Thorough Analysis of the Indian EV Charging Market* –
  This study delves into every facet of the Indian EV charging infrastructure, covering charging levels, modes, categories, as well as hardware and software specifications.

- *Overview of Standards and Regulations* –
  Several organizations play a role in establishing and assessing charging station standards, along with integrating EVs into the national grid.

- *Current Landscape and Future Expansion Plans* –
  The paper looks at the current state of charging infrastructure and outlines the planned developments for its growth in India.

- *Government Initiatives* –
  Both central and state governments have rolled out various policies and schemes aimed at boosting charging infrastructure and encouraging EV adoption among consumers.

- *Suggested Actions for Growth* –
  The study recommends strong measures and strategic actions to speed up the development of EV charging infrastructure in India.

- *Challenges in Expansion* –
  The research highlights significant hurdles in expanding EV charging networks, including technical, regulatory, and operational challenges.

- *High Priority for PPP Framework Development:*
  Policymakers are placing a strong emphasis on creating a framework for public-private partnerships (PPP) and franchise agreements to set up EV charging stations, with 38% marking it as Priority 1 and 35% as Priority 2. This highlights the recognition of PPP as a crucial factor in harnessing the technical know-how of power distribution companies (Discoms) alongside the financial resources of private developers.

- *Focus on Managed Charging and Grid Integration:*
  The next significant area of focus is on establishing frameworks for managed or coordinated charging. This aims to reduce the impact on distribution networks while encouraging the integration of renewable energy. This initiative received 31% as Priority 1 and 19% as Priority 2, underscoring the importance of seamlessly integrating EVs into the grid.

- *Moderate Priority for Tariff Structuring and Investments:*
  Other priorities include structuring tariffs for EV charging, which received 27% as Priority 2, and ensuring that EV infrastructure investments are included in retail tariffs, noted by 23% as Priority 2. This suggests that policymakers view financial viability and fair pricing for EV charging as moderately important.

- *Smart Grid Capabilities and Technical Standards:*
  Policymakers also see the adoption of smart grid technologies, such as smart metering and charging, as vital, with 35% ranking it as Priority 1. However, the need to define technical and connectivity standards for EV Supply Equipment (EVSE) is considered less urgent, though still acknowledged, with 19% as Priority 2 and 23% as Priority 3.

- *Regulatory Measures Seen as Critical:*
  52% of stakeholders believe that regulatory measures allowing Discoms to develop charging infrastructure are "Extremely important." Additionally, 26% view it as "Important," while only 10% consider it "Not required," reflecting a strong agreement on the necessity of enabling regulations.

Partnerships are key to speeding up the adoption of electric two-wheelers (E2Ws) by helping to quickly build accessible and affordable charging infrastructure. By teaming up with local businesses, real estate owners, resident associations, and utility companies, we can set up hyperlocal charging points much faster. These strategic collaborations give EV companies access to prime land and power connections, which would be costly and time-consuming to secure on their own.

For instance, real estate partners can offer physical space, charging solution providers take care of the technology and maintenance, and utility companies ensure grid connectivity. This cost-sharing model lightens the load for any single entity and makes the infrastructure financially feasible, even in areas where demand is initially low. Such collaborative investments also enable companies to provide affordable and reliable charging options to consumers, directly enhancing the appeal of E2Ws.

Another significant advantage of partnerships is the ability to create tailored charging solutions that fit specific local needs. Local players have a better grasp of regional mobility trends and consumer habits. Consequently, the infrastructure—whether it's battery swapping stations, fast chargers, or overnight residential chargers—can be fine-tuned to meet user requirements. For example, battery-swapping stations are ideal for bustling urban areas with high delivery activity, while residential slow chargers are a better match for Tier II and III towns.

III. IMPLICATIONS OF THE STUDY

- *For Electric Two-Wheeler Manufacturers:*
  The insights from this study can really help manufacturers grasp the value of forming strategic partnerships with local charging service providers. It could also steer their investment choices towards enhancing infrastructure, which in turn could boost sales. Plus, understanding customer preferences around charging convenience can shape product design, marketing efforts, and growth strategies.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug418

➢ *For Charging Infrastructure Providers:*

This research shines a light on the business opportunities that come from teaming up with EV brands to create charging solutions together. It might pave the way for innovative revenue-sharing models and service bundles that draw in more users and increase foot traffic.

➢ *For Policymakers and Urban Planners:*

The findings can bolster the argument for government incentives and public-private partnerships (PPP) aimed at promoting localized EV charging solutions. They could also guide the creation of EV-friendly policies, zoning laws, and urban planning initiatives focused on sustainable mobility.

➢ *For Consumers:*

A better grasp of local charging options could boost consumer confidence in making the switch to electric two-wheelers. The insights from this study can help alleviate "range anxiety" and encourage more sustainable choices.

➢ *For the Overall EV Ecosystem:*

This study highlights how crucial infrastructure development is to product adoption. It shows that increasing EV sales isn't solely about innovating products; it's also about building a supportive ecosystem through partnerships.

➢ *For Future Researchers:*

The study may open up exciting new avenues for research on EV infrastructure partnerships, regional charging habits, or market penetration strategies.

IV. CONCLUSION

This study highlights just how crucial strategic partnerships are in creating hyperlocal charging infrastructure and how these collaborations can really boost the sales of electric two-wheelers (E2Ws). The results show that having charging options that are easy to access and conveniently located can significantly build consumer confidence, ease range anxiety, and ultimately encourage more people to adopt E2Ws. Public-private partnerships (PPPs), along with collaborations involving local businesses, residential communities, and utility providers, are key players in rapidly and affordably developing this infrastructure. Public-Private Partnerships (PPPs) are for expanding electric vehicle charging infrastructure in Indian cities. The paper also discusses creative financing models like revenue-sharing and performance-based incentives to encourage more participation. One of the key takeaways is the effective use of government-owned spaces where private vendors can set up and run charging stations, with Delhi's low-tariff PPP model being a standout example. However, the study doesn't shy away from mentioning the hurdles we face, such as high setup costs, limitations in grid capacity, and a lack of standardization. It suggests looking into alternative funding sources, like CSR contributions and community-based models, to help areas that might not be commercially viable. In conclusion, the paper stresses that having clear policies, transparent regulatory processes, and strong standards is crucial for building investor confidence and creating a solid EV charging ecosystem in India.

By bringing together all the stakeholders—manufacturers, service providers, policymakers, and consumers—we can create a more cohesive, localized, and scalable charging network. These partnerships not only lighten the financial and operational load for individual players but also enable charging solutions to be customized to meet regional needs, whether in bustling urban centers or smaller towns.

The study's findings suggest that for India to meet its electric vehicle adoption targets and climate goals, a coordinated, partnership-focused approach to infrastructure development is vital. This strategy can help close the gap between policy intentions and real-world implementation, paving the way for a cleaner, more sustainable future in mobility.

REFERENCES

[1]. Ahmad, F., & Bilal, M. (2025). A Comprehensive Analysis of Electric Vehicle Charging Infrastructure, Standards, Policies, Aggregators and Challenges for the Indian Market. *International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering*, 14(2), pp. 115-124.

[2]. Frost & Sullivan (2025). Government Support, Increasing Investments, and Charging Infrastructure Development Underpin the Rise of India's Electric Two-Wheeler (e2W) Market. *Industry Report*, pp. 1-12.

[3]. Luo, Z. (2022). Powering Up a Slow Charging Market: How Do Government Subsidies Affect Charging Station Supply? *arXiv preprint*, arXiv:2210.14908, pp. 1-25.

[4]. Volttic Mobility & Kinetic Green Energy (2024). Collaborative Infrastructure Strategy for Two-Wheeler EV Adoption in Indian Cities. *Case Study Report*, pp. 1-9.

[5]. Singh, R., & Joshi, P. (2023). Impact of Public-Private Partnerships in EV Charging Infrastructure on Two-Wheeler Adoption in Tier-2 Cities. *Journal of Urban Transport & Technology*, 8(3), pp. 55–66.

[6]. Bery, S., & Chatterjee, A. (2023). Accelerating Electric Two-Wheeler Adoption through Shared Charging Infrastructure. *Journal of Sustainable Mobility and Energy Studies*, 12(1), pp. 34–49.

[7]. Bhattacharya, A., & Iyer, A. (2022). Role of Battery Swapping Partnerships in Enhancing Urban EV Ecosystem. *Indian Journal of Transportation and Mobility*, 10(4), pp. 101–114.

[8]. KPMG India (2023). Shaping the Indian Electric Mobility Ecosystem: Spotlight on Partnerships & Infrastructure. *KPMG Insights Report*, pp. 1–28. https://home.kpmg/in/en/home/insights/2023/09/electric-mobility-ecosystem.html

[9]. Ghosh, A. (2021). Financing Public-Private Models for EV Charging: Lessons from Indian Cities. *Energy Policy Review*, 45(2), pp. 88–97.