

NAVIGATING THE E-MOBILITY LANDSCAPE: FACTORS DRIVING ELECTRIC TWO-WHEELER PURCHASES

¹Asst.Prof. Ranu Nilesh Agrawal

Department of Commerce and Management
Dhanwate National College, Nagpur
Email id: ranugoyanka123@gmail.com

²Associate Professor Parag M. Joshi

Department of Commerce and Management
Dhanwate National College, Nagpur
Email Id: joshi.parag28@gmail.com

Abstract:

Although the market for electric vehicles (EVs) has grown dramatically in recent years, they still make up a very small portion of all new cars sold worldwide. Less than 1% of all two-wheelers sold in 2021 were electric. Thus, it is necessary to research the adoption of electric two-wheelers (E2W). A conceptual model of electric two-wheeler adoption factors is developed in this study. The goal of the current study was to determine the variables that affect consumers' intentions to purchase electric two-wheelers. The empirical findings show that consumers' attitudes regarding electric two-wheelers are strongly influenced by social influence, perceived economic gain, charging infrastructure, and environmental concerns. The consumer's intention to buy an electric two-wheeler is also highly influenced by their attitude. It was discovered that the primary factor driving people to buy electric two-wheelers was perceived economic benefits. Governments and manufacturers of electric two-wheelers can better understand consumer behaviour toward electric two-wheeler purchases with the help of these results.

Keywords: Electric Vehicles, Electric Two-wheelers, Electric Motorcycle, Green Consumption Behaviour, Behavioural Intention, Attitude, Adoption Factors.

Introduction :

The market share of electric vehicles (EVs) has grown dramatically in the last few years, although they still make up a very small portion of all new cars sold worldwide. Although they are still in their infancy in India, electric vehicles (EVs) are transforming the road transportation industry. Sales of unique cars reached 10 million worldwide in 2020, yet they made up just 1% of total sales. With 25 million of them, electric two-wheelers (E2W) will be the most popular type of EV in 2020, mostly because of rising demand in Asian nations. Because of emerging nations like China, Japan, and India, the largest market for electric two-wheelers is in Asia. Two-wheelers make up the majority of the Indian automotive market, accounting for over 80% of all sales. To lessen air pollution, the Indian government has set an aim that by 2030, thirty percent of all cars sold there will be electric. In 2020–2021, SIAM reports that 15,119,387 two-wheelers were sold in India; 143,837 of those were electric two-wheelers. In 2021, the total sales of electric two-wheelers were less than 1% only. In India, electric two-wheeler (E2W) adoption is quite low, even with several government initiatives. The EV two-wheelers adoption rate in India is down due to high upfront costs, range anxiety, inadequate charging stations, and battery replacement costs.

With 22 of the 30 most polluted cities worldwide, India is the third most polluted country in the world. Compounds including nitrogen, sulphur, carbon dioxide, dust, and ash



are the causes of air pollution. One of the main contributors to air pollution is carbon dioxide emissions, of which India is the third-largest emitter. The transportation industry in India emits the third highest CO₂. According to MOSPI data, the transportation industry accounts for around 7.5% of India's total carbon dioxide emissions. Given that EVs produce 50% less greenhouse gasses than gasoline or diesel, the switch to electric transportation has become necessary in this context to minimize greenhouse gas (GHG) emissions. Adopting EVs is therefore the greatest way to reduce the dangerously high levels of air pollution in India's congested cities. Electric cars fall into various categories, such as fuel cell EVs, hybrid EVs, plug-in hybrid EVs, extended-range EVs, and battery EVs. Electric motors powered by batteries are typically used to power electric two-wheelers.

Motorcycles, scooters, mopeds, and bicycles are all considered electric two-wheelers. Most people refer to electric bicycles as "e-bikes" or "electric bikes." It can only go as fast as 20 mph. In India, electric motorcycles and scooters are widely used. Lithium-ion or lead-acid batteries are used in electric two-wheelers. Hero Electric and Okinawa E2W, which together account for more than 50% of total sales in 2021, continue to dominate the Indian market. Since electric two-wheelers run on a portable battery that can be recharged using a regular wall socket in a home or workplace, they are better suited for developing nations like India. Because they emit no carbon dioxide, electric vehicles are becoming more and more popular as an environmentally beneficial substitute for gasoline-powered automobiles. Electric two-wheelers are far more energy-efficient than gasoline-powered two-wheelers.

Electric two-wheelers are far quieter, produce less pollution, and are more efficient than gasoline-powered two-wheelers. However, there is still a long way to go before electric motorcycles are widely used, and more research is needed to determine whether or not customers will accept this new product. The main issues with electric cars are their expensive batteries, which have a restricted driving range because of their low charging capacity, and their lengthy recharging times. Numerous studies on the subject of consumer acceptance of hybrid vehicles and electric vehicles have been published. Nevertheless, there isn't much published research on the use of electric two-wheelers. Few studies were conducted on electric two-wheelers, whereas the majority of earlier studies focused on the adoption of electric cars.

Electric two-wheelers are far quieter, produce less pollution, and are more efficient than gasoline-powered two-wheelers. But the application of It has been discovered that attitudes toward electric vehicles vary depending on the region and state of the economy. Creating an adoption model for electric two-wheelers was the aim of this study. From the literature review, this study determined the variables that influence consumers' intentions to buy electric two-wheelers. Using the suggested paradigm, appropriate policies can be created to hasten the purchase of electric two-wheelers. The suggested model might also serve as a guide for businesses that offer electric two-wheelers. The administration is encouraging people to accept EVs will lower pollution and the nation's reliance on foreign oil.

Objective :

- To analyse the factors driving electric two-wheeler purchases.
- To analyse perceived economic benefits to understand their influence on consumer's adoption of electric two-wheelers.



- To examine the role of social influence in shaping consumer behaviour towards electric two-wheeler purchases.
- To assess the significance of charging infrastructure availability on consumer adoption of electric two-wheelers.

Conceptual Framework :

The expanded Theory of Planned Behaviour serves as the foundation for this study's research framework. The literature analysis on consumer acceptance of electric vehicles served as the basis for the development of the framework's variables. This study looks into consumers' intentions to acquire electric two-wheelers, whereas the majority of earlier studies solely looked at consumers' intentions to buy electric automobiles. In this study, intentions to buy electric two-wheelers are influenced by perceived economic rewards, attitude, social influence, charging infrastructure, and environmental concerns. In Figure 1, a conceptual model is displayed. The rationale behind choosing an electric vehicle was its economic viability. To investigate the intentions of 233 respondents in Taiwan to acquire hydrogen-electric motorcycles, Chen et al. (2017) conducted a survey. The results of their study demonstrated that purchase intentions are positively influenced by perceived value, perceived quality, and product knowledge.

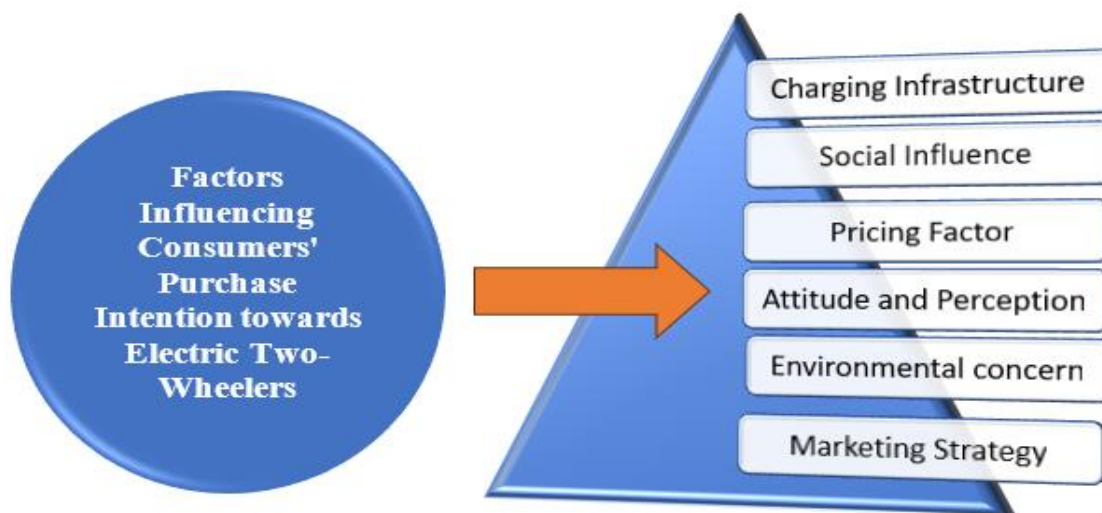


Figure 1. Conceptual model

Numerous researchers have examined the connection between consumer purchasing behaviour and environmental concern and have discovered that consumers who have greater environmental care persist more likely to purchase environmentally friendly goods, such as electric two-wheelers. Considering earlier studies. Given earlier studies Furthermore, it is evident that customers that care deeply about the environment might think about purchasing eco-friendly or green products like electric vehicles.

List of Factors influenced Consumer's purchase intentions of Electric two wheeler vehicle:

Pricing Factor:

Purchase decision of vehicles always come under Rational Model Of purchase, which

means that the vehicle which provides Value for Money is always sort after. But in Regards to Electric Vehicle a very interesting phenomenon is studied that the initial heavy cost of Electric Vehicle is responsible for negative perception of Electric Vehicles and on contrary long run fuel saving and effectiveness leads to a little positive thrust to perception and adoption.

But theory of Time Value of Money actually creates a negative perception in minds of consumers. This can lead to a new model, which can be purposed to Government of India,” to safeguard the future of country , environmental need to be protected for which government is fuelling manufactures to make Electric Vehicles. But this cannot be successful, A Study of Consumer Perception and Purchase Intention of Electric Vehicles 366 until and unless consumers purchase it. To increase sale government must facilitate people with free or subsidized loan, free insurance, free parking”.

The current study reveals that the correlation between low cost and purchase intention is significant means if the cost of the vehicle will go down the intention to purchase the decision will go up. Here it is the responsibility of the electric vehicle producers to produce low cost vehicle by minimizing various variable costs and also government must offer some subsidy to the customer and or provide bank loans at reduced interest rate.

Social Influence:

Social influence encompasses the impact of recommendations or persuasion from friends, family, or colleagues on a consumer’s decision to purchase an electric two-wheeler. Positive word-of-mouth and social norms favouring sustainable transportation can boost the appeal of EVs. Opinion leaders, including celebrities, influencers, and respected public figures, can sway public perception and adoption rates through endorsements and advocacy. As electric vehicles become more popular and socially accepted, potential buyers may feel a stronger inclination to align with these trends, further reinforced by their social circles and community networks.

Environmental Concern:

Environment is decorating day by day, and the crown for the same can be placed on head of technological advancement. People now, are well aware of the harmful effect of environment degradation and are put effort to safeguard the same. These concerns are even visible during purchase decision of consumer products especially transport vehicles. Government of every country is also concerned for the same aspect and is either prohibiting the use of vehicles responsible for higher degree of pollution. In India, apart from driving license, pollution check is equally important. Environmental concern is a basic dimension which motivated manufactures to build electric vehicles, government to thrust its production and consumer to increase its sale.

Environmental concern is a growing influence on consumer behaviour, with increasing awareness of the ecological impact of transportation choices. Consumers are drawn to electric two-wheeler due to their lower emissions and reduced carbon footprint compared to gasoline-powered vehicles. The sustainability of the manufacturing process and the use of eco-friendly materials also appeal to environmentally conscious buyers. Regulatory policies promoting green transportation further encourage the shift towards electric vehicles. By aligning with



environmental values, consumers can feel they are contributing to a healthier planet, which strengthens their purchase intention.

Marketing Strategy:

Effective marketing strategies are crucial in influencing consumers' purchase intentions. Engaging advertisements that highlight the unique benefits and features of electric two-wheelers can capture attention and interest. Promotional offers, such as discounts, trade-in deals, and bundled packages, make the purchase more attractive by providing additional value. Direct customer engagement through social media, events, test drives, and feedback mechanisms helps build a connection with potential buyers. A well-executed marketing strategy that communicates the advantages, addresses concerns, and resonates with consumer values can significantly boost the adoption of electric two-wheelers.

Charging Infrastructure:

One of the main factors impacting the adoption of electric vehicles is often cited as being the charging infrastructure. The primary cause of this is consumer anxiety that electric vehicles (EVs) may run out of juice in between charging stations. Accessible charging stations near homes, workplaces, or public areas reduce range anxiety and make the idea of owning an electric vehicle (EV) more appealing. Charging speed is another critical aspect, with faster charging options being highly desirable to minimize downtime. The reliability of these stations, ensuring they are operational and well-maintained, adds to consumer confidence. Compatibility between different charging stations and electric two-wheeler models also plays a role, as standardized charging ports facilitate ease of use and convenience. Overall, a robust and user-friendly charging infrastructure is essential to support the widespread adoption of electric two-wheelers.

Charging Infrastructure is a basic requirement for any new vision to be converted into reality. Lack of infrastructure makes an innovation die at its induction stage. Infrastructure required for creating positive perception for electric vehicles and finally its adoption is roads, recharging stations, battery exchange and service stations. Non availability rather poor conditions of existing infrastructure are compelling consumers not to shell out their money into adoption of electric vehicle.

Attitude and Purchase Intention:

Consumer's attitudes and perceptions about electric two-wheelers significantly impact their purchase decisions. A strong brand image and the reputation of the manufacturer can foster trust and confidence in the product. Perceived reliability and performance, influenced by reviews and personal experiences, shape consumer expectations and willingness to invest in an EV. Positive user experiences, whether through test rides or testimonials, reinforce the vehicle's appeal. Overall, favourable attitudes and perceptions about the practicality, efficiency, and benefits of electric two-wheelers can drive higher adoption rates.

Attitudes towards EVs encompass individuals' overall evaluations and feelings, shaped



significantly by environmental concerns, perceived economic benefits, social influences, and personal experiences. Environmental considerations, such as reducing carbon footprints and air pollution, often sway attitudes positively, while the economic advantages like lower operating costs and government incentives further bolster favourable attitudes.

Purchase intentions, crucial for predicting actual buying behaviour, are influenced by these attitudes along with factors like perceived ease of use (including concerns about charging infrastructure and range limitations), societal expectations, and personal values. Measurement of purchase intentions typically involves direct inquiries about the likelihood and timeframe of buying an EV, often gauged through standardized scales.

Limitations:

- **High Initial Cost:** The high upfront cost of electric two-wheelers deters price-sensitive consumers despite potential long-term savings. This steep initial investment remains a significant barrier to adoption.
- **Inadequate Charging Infrastructure:** Limited availability of charging stations causes range anxiety, especially in rural and semi-urban areas. This insufficient infrastructure hinders daily use and widespread adoption.
- **Battery Technology Challenges:** Current batteries have limited range, long charging times, and high replacement costs, affecting reliability and cost-effectiveness. These issues reduce consumer confidence in E2Ws.
- **Social Acceptance and Perception:** Negative perceptions about E2Ws' practicality and efficiency compared to traditional vehicles deter potential buyers. Social influence from peers and public figures currently lacks strong endorsements.
- **Financial and Economic Barriers:** The financial advantages of E2Ws are overshadowed by high initial purchasing costs. Adoption is further restricted by limited access to financial aid such as low-interest loans and subsidies.
- **Lack of Focused Research:** Since most studies concentrate on electric vehicles, there are gaps in our knowledge of the variables affecting the adoption of E2W. More focused research is required to offer data-driven insights for practical tactics.

Conclusion:

- The electric two-wheeler (E2W) market is rapidly growing due to increased environmental awareness, regulatory changes, and technological advancements.
- The electric two-wheeler (E2Ws) have the potential to significantly reduce greenhouse gas emissions and improve urban air quality.
- Despite their benefits, the adoption rate of electric two-wheelers (E2Ws) in India remains low due to high initial costs, limited range, inadequate charging infrastructure, and expensive battery replacements.
- There is substantial opportunity for electric two-wheelers (E2Ws) in India, where the two-wheeler market is dominant.
- Social influence, effective marketing strategies, and overcoming infrastructure and financial barriers can significantly boost electric two-wheelers (E2Ws) adoption.
- Government support is crucial in financing electric two-wheelers (E2Ws), improving

charging infrastructure, and increasing public awareness of their environmental benefits. As consumers become more environmentally conscious and recognize the long-term financial benefits, the adoption of electric two-wheelers (E2Ws) is expected to accelerate.

- Increased use of electric two-wheelers (E2Ws) will contribute to reducing urban air pollution and dependency on fossil fuels.
- The trend towards electric two-wheelers (E2Ws) is expected to gain momentum, driven by cost-conscious and environmentally aware consumers.

References :

- Cover, A. K., Álvarez, A., Barānovs, O., Bastarrica, F., Bogdanova, O., Carlos, F., Carvalho, N., Chiara, L., Dombrovskis, V., Estrada, I., Ferrés, F., Ferreira, P., Fragkiadakis, D., Fragkiadakis, K., Frade, P., Gičevskis, K., Gomes, J., Gonçalves, M., Groza, E., . . . Bogdanova, A. (2023b). Towards climate neutrality: Economic impacts, opportunities and risks. <https://doi.org/10.22364/tcn.23IEA> Prospects for Electric Vehicle Deployment. Available online: <https://www.iea.org/reports/global-ev-outlook-2021>
- Kumar Satyam. How Better Financing Options Can Help Drive Electric Two-Wheeler Adoption in India. Available on- line: <https://www.financialexpress.com/auto/electric-vehicles/better-financing-options-to-help-drive-electric-two-wheeler-adoption-in-india-heres-how/2308807/> (accessed on 2 October 2021).
- Society of Indian Automobile Manufacturers (SIAM). Domestic Sales Trends. 2021. Available online: <https://www.siam.in/statistics.aspx?mpgid=8&pgidtrail=14> (accessed on 5 October 2021).
- Brar, L.; Burgoyne, B.; Eriksson, L.; Likhari, R.; Skoufa, T.; Williams, L. The India Electric Vehicle Opportunity: Market Entry Toolkit;
- JMK Research. E-Two-Wheeler India Market Outlook. 2021. Available online: <https://jmkresearch.com/electric-vehicles-published-reports/electric-two-wheeler-india-market-outlook-2/> (accessed on 5 October 2021).
- Union of Concerned Scientists. Each Country's Share of CO2 Emissions. Available online: <https://www.ucsusa.org/resources/each-countrys-share-co2-emissions> (accessed on 23 June 2021).
- NITI Aayog. NITI Aayog and World Resources Institute India Jointly Launch 'Forum for Decarbonizing Transport' in India. Available online: <https://pib.gov.in/PressReleasePage.aspx?PRID=1748514> (accessed on 4 March 2021).
- Tarei, P.K.; Chand, P.; Gupta, H. Barriers to the adoption of electric vehicles: Evidence from India. *J. Clean. Prod.* 2021, 291, 125847.
- Chéron, E.; Zins, M. Electric vehicle purchasing intentions: The concern over battery charge duration. *Transp. Res. Part A Policy Pr.* 1997, 31, 235–243.
- Coffman, M.; Bernstein, P.; Wee, S. Electric vehicles revisited: A review of factors that affect adoption. *Transp. Rev.* 2016, 37, 79–93.

