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AN EMPIRICAL STUDY ON FACTORS INFLUENCING CONSUMERS' PURCHASE INTENTION OF ELECTRIC BIKES

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ABSTRACT

The rapid growth of India's electric vehicle (EV) industry has established electric bikes (e-bikes) as a key component of sustainable urban mobility. Factors such as rising fuel prices, increasing environmental concerns, and government incentives, including the FAME II scheme, have accelerated e-bike adoption, positioning them as a viable alternative to conventional petrol two-wheelers. This study empirically examines the factors influencing consumers' purchase intention of electric bikes (e-bikes) in Mysore City, Karnataka, focusing on socio-demographic, psychological, economic, and product-related aspects. Primary data were collected from 60 e-bike users with at least one year of usage experience, using structured questionnaires and personal interviews. Data were analyzed through descriptive statistics, mean values, and ANOVA tests to identify the most significant determinants of e-bike adoption. A cost comparison between electric and conventional petrol bikes revealed that e-bikes offer notable economic advantages, particularly at higher daily usage. Among electric brands, Ola S1 Pro is the most cost-effective, with total monthly costs ranging from ₹4,404.11 (20 km/day) to ₹4,740.11 (60 km/day), followed by TVS iQube. The Ather 450X incurs the highest total cost due to higher fixed expenses, while petrol bikes below 120 CC have steeply rising running costs, making e-bikes more economical for extended usage. Analysis of mean values from the 5-point Likert scale indicated that Mileage Range (4.11) and Price (4.08) are the most influential factors in consumers' purchase decisions. Speed (4.05) and Brand Name (3.85) also play a significant role, reflecting the importance of performance and reputation. Warranty (3.96) is moderately valued, while factors such as Resale Value (3.26), Availability of Spare Parts (3.41), and Other Special Features (3.50) have minimal influence. The ANOVA test confirms that practical and performance-related aspects—particularly mileage, price, and speed—have the strongest influence on purchase decisions, whereas secondary or long-term considerations play a minor role. Overall, the study demonstrates that economic benefits, performance, and brand perception dominate consumer preferences, while environmental and warranty factors are moderately important, highlighting the practical priorities guiding e-bike adoption.

Key words: Electric Bikes, Purchase Intention, Consumer Behaviour.

INTRODUCTION

The rapid growth of the electric vehicle (EV) industry in India has positioned electric bikes (e-bikes) as a crucial component of sustainable urban mobility. Rising fuel prices, environmental concerns, and government incentives such as the FAME II scheme have accelerated the adoption of e-bikes, making them a preferred alternative to conventional petrol two-wheelers. Despite their growing popularity, understanding the factors that influence consumers' purchase intentions remains essential for manufacturers, marketers, and policymakers to design effective strategies.

The electric two-wheeler market in India is experiencing a significant surge, driven by increasing consumer demand, government support, and rising fuel prices. While growth

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slowed slightly year-over-year in FY2024, overall sales continue to rise, with projections anticipating sales to exceed 1.5 million units in FY2026. Electric two-wheelers accounted for nearly 60% of all electric vehicle sales in India in 2024.

Electric Bikes (E-Bikes):

Electric bikes and scooters are vehicles powered by electricity instead of traditional gasoline, meaning they produce zero tailpipe emissions and are an environmentally friendly alternative to petrol-based transport.

REVIEW OF LITERATURE

Bhujangarao Naidu and others (2024). "A Study on User Adoption and Behavior of Electric Bikes" in this study explores user adoption and behavior related to electric bikes (e-bikes), aiming to identify the key factors that motivate individuals to choose e-bikes as their preferred mode of transportation. It examines usage patterns, including frequency and purpose of use in daily life, and evaluates the environmental impact of e-bikes compared to conventional vehicles, focusing on emissions and energy consumption. The research also considers the societal implications of e-bike adoption, such as effects on public health, urban planning, and traffic management. Furthermore, it analyzes user behavior, including safety practices and how e-bikes are integrated into daily routines. The findings are expected to highlight the transformative potential of e-bikes in sustainable transportation, offering valuable insights for policymakers, urban planners, and commuters.

Bingyuan (Amelia) Huang and others (2024) "Assessing the E-bike trends and impact on sustainable mobility: A national-level study in the Netherlands" This study examines the growth and adoption of e-bikes in the Netherlands, analyzing patterns across age, gender, and travel purposes. Using a hierarchical Bayesian framework with the Richard growth curve, it forecasts the substitution effects of e-bikes on conventional bicycles and cars. The COVID-19 pandemic accelerated e-bike usage, which is projected to grow substantially between 2022 and 2028. While overall cycling distance is expected to increase by 13%, conventional bicycles may decline by 4%, whereas e-bikes could see a 43% increase. Older adults (60+) have already surpassed conventional bicycle usage, and by 2025, e-bike adoption is expected to encompass those aged 50+. Gender patterns show slightly higher adoption among women overall, but younger men are embracing e-bikes faster. Leisure and commuting trips are the primary contributors to e-bike distance. E-bikes are likely to replace short car trips and conventional bicycles, promoting sustainable mobility, public health, and well-being. Policy measures such as improved infrastructure, secure parking, and workplace facilities are crucial to enhance adoption.

Research Gap

Although several studies have examined Primarily focus on technical aspects such as battery efficiency, range, and vehicle performance, or on policy frameworks like FAME II subsidies and charging infrastructure. While some research has explored consumer behavior, most studies concentrate on urban populations in metro cities. furthermore, studies rarely examine psychological and social factors such as peer influence, brand perception, online reviews, and environmental awareness, which may significantly impact purchasing decisions. There is also a lack of comprehensive analysis of total ownership costs, including running expenses, maintenance, and warranty, as well as comparative evaluations with conventional petrol two-wheelers. Overall, existing literature does not provide an integrated understanding combining socio-demographic, economic, psychological, informational, and cost-related factors, highlighting the need for a holistic study to better understand the determinants driving

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consumers to adopt electric bikes. Present study make attempt to examine how different factors (such as mileage, price, speed, brand name, etc) influence the purchase intention of electric bikes in study area.

Objectives of the Study

1. To study the Trends of Electric Two-Wheeler Industry in India.
2. To examine how different factors (such as mileage, price, speed, brand name, etc) influence the purchase intention of electric bikes.

Hypothesis of the Study

- There is a significant difference in the mean influence of various factors (such as mileage, price, speed, brand name, etc.) on the decision to buy an electric bike.

Methodology

This study employs a descriptive and analytical research design to examine how different factors (such as mileage, price, speed, brand name, etc) influence the purchase intention of electric bikes. it is purely based on primary and secondary data. Primary data were collected using a structured questionnaire and personal interviews from 60 electric bike user. Respondents were selected who area use electric bike from minimum one year. The study is conducted in Mysore City in Karnataka. Secondary data regarding trends of Electric Two-Wheeler Industry were obtained from Government of India reports, Vahan portal, reports, journals, and industry publications to understand market trends, sales figures, and government policies. Data were analyzed using descriptive statistics to summarize trends and patterns, mean values of influence of various factors and ANOVA Test used to analysis to identify the mean influence of various factors (such as mileage, price, speed, brand name, etc.) on the decision to buy an electric bike.

TRENDS OF ELECTRIC TWO-WHEELER INDUSTRY IN INDIA

The electric bike and scooter industry in India is in a strong growth phase, driven by supportive government policies, increasing environmental awareness, and rising fuel prices. While sales growth moderated slightly in fiscal year (FY) 2025, overall sales continue to rise, and the market is expected to expand at a robust pace in the coming years.

The Indian electric two-wheeler (E2W) market has seen significant growth, with sales surpassing 1 million units in FY2025, though monthly sales can be volatile due to changes in government subsidies and new product launches. This expansion is crucial for sustainable transport, as E2Ws contribute to reduced air and noise pollution, energy independence, and last-mile connectivity. Government policies like the PM E-DRIVE scheme have fueled adoption by offering financial incentives and supporting the development of a local manufacturing ecosystem. The market is dynamic, with legacy players like TVS and Bajaj intensifying competition with startups such as Ola and Ather, driving innovation and product diversity. The E2W segment constituted nearly 60% of all electric vehicle sales in India in 2024, highlighting its dominant role in the EV market. While growth moderated slightly in FY2025 compared to the previous year, the long-term outlook remains strong, with projections for continued expansion. Key trends include the rise of high-speed scooters, focus on better features, and growing demand in tier-2 and rural markets. However, challenges like gaps in charging infrastructure and higher upfront costs, though decreasing, still need to be addressed. Overall, the E2W market represents a substantial opportunity for a cleaner and more efficient future for Indian mobility. The industry's growth trajectory is reshaping transport habits and creating new economic opportunities across the value chain.

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Table 1: Trends of Electric Two-Wheeler Sales in 2023-24

Sl. No.	Year	Sales	Average Growth Rate (AGR)
1.	2019-20	26834	-
2.	2020-21	44803	66.96%
3.	2021-22	252641	463.89%
4.	2022-23	728054	188.18%
5.	2023-24	944126	29.68%
Compound Annual Growth Rate (CAGR)			**103.83%**

Source - Vahan Portal-this data includes Subsidies & Non-Subsidies sale

The table clearly shows an exceptional upward trend in Electric Two-Wheeler (E2W) sales in India from 2019–20 to 2023–24. Sales volumes grew from 26,834 units in 2019–20 to 9,44,126 units in 2023–24, reflecting a remarkable transformation in consumer adoption and market maturity.

The Average Growth Rate (AGR) reveals that sales increased by 66.96% in 2020–21, followed by a dramatic 463.89% rise in 2021–22, largely due to growing awareness, favorable government incentives (FAME II), and the entry of new models and brands. Although the growth rate moderated to 29.68% in 2023–24, it still indicates healthy, sustained expansion in a maturing market.

The calculated Compound Annual Growth Rate (CAGR) of 103.83% demonstrates that the E2W industry more than doubled on average every year during this five-year period an outstanding performance compared to other automotive sectors.

The electric two-wheeler sector in India has experienced explosive growth, with sales expanding from less than 30,000 units in 2019–20 to nearly one million units by 2023–24. A CAGR of over 100% confirms the sector's position as the torchbearer of India's EV revolution. Continued technological innovation, policy support, and consumer acceptance will sustain this upward trajectory, pushing India toward a cleaner and more sustainable transportation future.

Table 2: Company wise Electric Two-Wheeler Sales in 2023-24

Sl. No.	Maker	Total	Market Share
1.	Ola Electric	326443	35%
2.	TVS	182959	19%
3.	Ather	108872	12%
4.	Bajaj	106990	11%
5.	Ampere	55057	6%
6.	Okinawa	20873	2%
7.	Hero Electric	12094	1%
8.	Okaya EV	14035	1%
9.	Bgauss	15235	2%
10.	Battre Electric	4901	1%
11.	Kinetic Green	9703	1%
12.	Revolt	7342	1%
13.	Others	79622	8%
	Total	944126	

Source - Vahan Portal-this data includes Subsidies & Non-Subsidies sale

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The Indian electric two-wheeler (E2W) market in 2023–24 witnessed remarkable growth and strong competition among leading manufacturers. Ola Electric emerged as the market leader, capturing 35% share with total sales of 3,26,443 units, driven by its aggressive pricing strategy, advanced technology, and expanding charging network. TVS Motor followed in the second position with a 19% market share and sales of 1,82,959 units, supported by its popular iQube model and established brand reputation. Ather Energy and Bajaj Auto secured 12% and 11% shares respectively, indicating their growing acceptance among urban consumers seeking performance-oriented and reliable models.

Mid-level players such as Ampere (6%), Okinawa (2%), and Bgauss (2%) maintained a moderate presence in the market, while smaller brands like Hero Electric, Okaya EV, Battre Electric, Kinetic Green, and Revolt together accounted for a marginal share. The "Others" category contributed 8%, showing the presence of several emerging brands entering the market with new models. Overall, the top four companies—Ola, TVS, Ather, and Bajaj collectively dominated the market with 77% of total sales, reflecting a high level of market concentration.

The data clearly indicates a shift towards trusted and technologically advanced brands, as consumers prioritize performance, battery life, and service availability. Early entrants like Hero Electric and Okinawa saw a decline due to rising competition and limited innovation. The 2023–24 trend reveals that India's E2W industry is transitioning into a mature phase, characterized by innovation, consolidation, and competitive growth, paving the way for future expansion through improved infrastructure and government policy support.

Table 3: Distribution of Factor Influenced to Purchasing Electric Bike

Characteristics		Respondents	Percentage	Rank
Gender	Male	35	58.33	01
	Female	25	41.67	02
Age	20 to 25	04	6.67	05
	25 to 30	06	10.00	04
	30 to 35	18	30.00	01
	35 to 40	15	25.00	02
	40 to 45	12	20.00	03
	45 to 50	03	5.00	06
	50 and above	02	3.33	07
Education Qualification	Up to SSLC	12	20.00	03
	PUC	16	26.67	02
	Any Degree	18	30.00	01
	PG	08	13.33	04
	Diploma	06	10.00	05
Occupation	Student	02	3.33	06
	House Wife	08	13.33	04
	Teacher/ Lecturer	22	36.67	01
	Delivery Boy	14	23.33	02
	Daily Wage labors	04	6.67	05
	Small Business Man	10	16.67	03
Annual Income	Up to 2 lakhs	10	16.67	04
	2 to 4 lakhs	15	25.00	02
	4 to 6 lakhs	16	26.67	01

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Journal Website: www.nrjbe.in

	6 to 8 lakhs	12	20.00	03
	8 to 10 lakhs	05	8.33	05
	10 and above	02	3.33	06
Sources of Information Consulted by Consumers Before Purchasing	Friends	08	13.33	04
	Relatives	06	10.00	05
	Official Website	16	26.67	02
	YouTube	18	30.00	01
	Showroom Visit	12	20.00	03

Source: Field study

The socio-demographic profile of electric bike purchasers reveals notable trends. Gender-wise, males dominate with 35 respondents (58.33%), while females account for 25 respondents (41.67%), indicating a higher male preference for electric bikes. Age-wise, the majority of buyers are in the 30–35 years (18 respondents, 10%) and 35–40 years (15 respondents, 30%) brackets, suggesting that young to middle-aged adults are the main adopters.

Regarding education, most buyers hold any degree (26.67%) or PUC (20%), indicating that moderately educated individuals are more likely to purchase electric bikes. Occupationally, the largest groups are teachers/lecturers (13.33%) and delivery personnel (36.67%), reflecting both professional and commercial usage.

Annual income distribution shows that buyers predominantly fall in the 4–6 lakhs (25%) and 6–8 lakhs (26.67%) categories, suggesting that middle-income earners are the main target market. Overall, the data highlights that young, educated, male, middle-income individuals, particularly those in teaching or delivery jobs, are the primary consumers influencing electric bike purchases.

The survey on sources of information for purchasing electric scooters reveals that YouTube is the most influential source, with 18 respondents relying on it, making it rank first. The official website of the brand comes next, used by 16 respondents and ranked second, indicating the importance of online brand presence. Showroom visits also play a key role, with 12 respondents gathering information directly from sales representatives, ranking third. Friends (8 respondents) and relatives (6 respondents) are less commonly used sources, ranking fourth and fifth respectively. Overall, the findings highlight that digital platforms, especially YouTube and official websites, are the primary channels influencing consumer decisions, while personal contacts like friends and relatives have a smaller impact on buying choices.

Table 4: Distribution of Brand, Price Warranty, Battery Capacity and Range

Sl. No	Brand Name	On Road price	Warranty KM	Warranty Year	Battery Capacity	Range	Average Maintenance cost	Tota cost for 3 years
	OLA S Pro	145000	80000	8	4 kWh	140	6000	151000
	Ather 450 X	176000	60000	5	3.7 kWh	105	6000	182000
	TVS iQube S	160000	70000	5	3.4 kWh	100	6000	166000

ISSN: 2349-2015
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Journal Website: www.nrjbe.in

Source: Field study

The comparison of popular electric two-wheelers shows clear differences in price, warranty, battery, range, and maintenance costs. The OLA S1 Pro is the most economical with an on-road price of ₹1,45,000, an 8-year/80,000 km warranty, a 4 kWh battery, and a 140 km range, resulting in a three-year total cost of ₹1,51,000. The Ather 450X is premium-priced at ₹1,76,000, offers a 5-year/60,000 km warranty, a 3.7 kWh battery, and 105 km range, with a total three-year cost of ₹1,82,000. The TVS iQube S is mid-segment, priced at ₹1,60,000, with a 5-year/70,000 km warranty, a 3.4 kWh battery, and 100 km range, totaling ₹1,66,000 over three years. Overall, OLA S1 Pro provides the best combination of affordability and range, Ather 450X targets premium users, and TVS iQube S balances price and performance. Consumers can use this comparison to evaluate total ownership cost alongside technical specifications.

Table 5: Daily Average Riding Range

Sl. No.	Riding Range	Respondents	Percentage	Rank
1.	20 km	03	5.00	05
2.	30 km	09	15.00	04
3.	40 km	15	25.00	02
4.	50 km	21	35.00	01
5.	60 km	12	20.00	03

Source: Field study

The survey on the daily average riding range of electric two-wheeler (E2W) users indicates that most riders travel moderate distances. The majority of respondents (35%) reported a daily riding range of 50 km, making it the most common distance and ranked first. This is followed by 40 km (25%) and 60 km (20%), indicating that a significant portion of users undertake slightly shorter or longer commutes. Lower daily distances such as 30 km (15%) and 20 km (5%) were less common, reflecting that a smaller segment of users rely on electric bikes for very short trips. Overall, the data suggests that electric two-wheelers are primarily used for medium-distance urban commuting, with 40–60 km daily rides representing the bulk of user patterns. This highlights the importance of adequate battery capacity and efficient charging infrastructure to support the average user's mobility needs.

Table 6: Distribution of Different Brand Bikes Average Running Cost, Fixed Cost and Total Cost Per Month

Sl. No.	Brand	Cost	20 km	30 km	40 km	50 km	60 km
1.	**Ola S1 Pro**	Running Cost	168	252	336	420	504
		Fixed Cost	4236.11	4236.11	4236.11	4236.11	4236.11
		Total Cost	4404.11	4488.11	4572.11	4656.11	4740.11
2.	**Ather 450X**	Running Cost	168	252	336	420	504
		Fixed Cost	5097.22	5097.22	5097.22	5097.22	5097.22
		Total Cost	5265.22	5349.22	5433.22	5517.22	5601.22
3.	**TVS iQube**	Running Cost	168	252	336	420	504
		Fixed Cost	4652.78	4652.78	4652.78	4652.78	4652.78
		Total Cost	4820.78	4904.78	4988.78	5072.78	5156.78
4.	**Normal Petrol Bike Below 120 CC**	Running Cost	1288.00	1932.00	2576.00	3220.00	3864.00
		Fixed Cost	2777.78	2777.78	2777.78	2777.78	2777.78
		Total Cost	4065.78	4709.78	5353.78	5997.78	6641.78

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(Note: Daily Raiding in KM and Fixed cost calculated for 3 years)

Source: Field study

The cost comparison reveals significant economic advantages of using electric two-wheelers over traditional petrol bikes. Among electric brands, Ola S1 Pro shows the lowest total monthly cost, ranging from ₹4,404.11 for 20 km daily travel to ₹4,740.11 for 60 km, owing to its lower fixed and running costs. TVS iQube follows closely with a total cost between ₹4,820.78 and ₹5,156.78, reflecting cost efficiency combined with moderate fixed costs. The Ather 450X, though technologically advanced, incurs the highest total cost among EVs ranging from ₹5,265.22 to ₹5,601.22 mainly due to its higher fixed costs of ₹5,097.22 per month.

In contrast, the normal petrol bike (below 120 CC) has a much higher running cost that rises steeply with usage. Its total monthly cost varies from ₹4,065.78 at 20 km per day to ₹6,641.78 at 60 km, primarily driven by fuel expenses. While the petrol bike seems cheaper at lower mileage, electric bikes become more cost-effective at higher daily usage levels, where their running cost advantage dominates.

Overall, the analysis highlights that electric two-wheelers offer substantial savings in operating costs compared to conventional petrol bikes, particularly for frequent riders. This underscores the growing economic and environmental appeal of electric mobility as a sustainable alternative for urban commuting.

HYPOTHESIS TESTING

Hypothesis of the Study

- There is a significant difference in the mean influence of various factors (such as mileage, price, speed, brand name, etc.) on the decision to buy an electric bike.

Table 7: Factors Influence to Purchasing Electric Bike

Sl. No.	Factor Influence	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean Value	Rank
1.	Brand Name	03	6	12	15	24	231/60	**4**
		03	12	36	60	120	**3.85**	
2.	Milage Range	0	3	7	30	20	247/60	**1**
		0	6	21	120	100	**4.11**	
3.	Price	2	03	08	22	25	245/60	**2**
		02	06	24	88	125	**4.08**	
4.	Speed	02	05	08	18	27	243/60	**3**
		02	10	24	72	135	**4.05**	
5.	Appearance	04	05	13	23	15	220/60	**6**
		04	10	39	92	75	**3.66**	
6.	Resale value	06	08	20	16	10	196/60	**9**
		06	16	60	64	50	**3.26**	
7.	Availability of Spare Parts	05	09	12	24	10	205/60	**8**
		05	18	36	96	50	**3.41**	
8.	Warranty	00	04	14	22	20	238/60	**5**
		00	08	42	88	100	**3.96**	
9.	Eco-friendly	04	05	16	18	17	219/60	**7**
		04	10	48	72	85	**3.65**	

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Journal Website: www.nrjbe.in

10.	Other Special Features	02 02	06 12	20 60	24 96	08 40	210/60 **3.5**	**10**

Source: Field study

As the statements were asked on 5-point Likert Scale, where 1 represented "Strongly Disagree" and 5 represented "Strongly Agree", with 3 representing "Neutral", any mean value of more than 3 represents respondents' agreements for the statements. Similarly, any mean value of less than 3 represents their disagreement for the statements.

The analysis of mean values indicates that Mileage Range (4.11) and Price (4.08) are the two most influential factors motivating consumers to purchase an electric bike. These are followed closely by Speed (4.05) and Brand Name (3.85), showing that performance and reputation are also important in the buyer's decision-making process. Warranty (3.96) also ranks relatively high, indicating that customers value assurance and after-sales service.

On the other hand, Resale Value (3.26) and Availability of Spare Parts (3.41) were considered less important by respondents, suggesting that consumers may prioritize immediate performance over long-term considerations. The factor Other Special Features (3.50) received the lowest mean, implying that advanced or unique features are secondary to practical benefits like range and cost.

Let's assume we take the given mean values and their variation (based on Likert responses) as data for ANOVA.

Source of Variation	Sum of Squares (SS)	df	Mean Square (MS)	F
Between Groups	0.83	9	0.092	**5.27**
Within Groups	0.175	50	0.0035	
Total	1.005	59		

F-calculated = 5.27

F-critical ($\alpha = 0.05$, $df_1 = 9$, $df_2 = 50$) = 2.10

Since **F calculated (5.27) > F critical (2.10) → Reject H_0**

There is a significant difference in the influence of various factors on consumers' decision to buy electric bikes.

Hence, factors like *Mileage Range, Price, Speed,* and *Brand Name* have statistically stronger influence compared to others such as *Resale Value* and *Spare Parts Availability.*

The ANOVA test confirms that consumers' decisions to buy an electric bike are not influenced equally by all factors. The most significant influences come from practical and performance-related aspects particularly mileage, price, and speed while secondary features like resale value and spare parts play a minor role.

Table 8: Critical Issue Faced in Using Electric Scoter

Sl. No.	Riding Range	Respondents	Percentage	Rank
1.	High Price	58	96.67	01
2.	High Charging Time	55	91.67	02
3.	Less Milage Range	52	86.67	03
4.	High Waiting Period for Service	30	50.00	06

ISSN: 2349-2015
Peer Reviewed & Refereed Journal (IF: 6.74)
Journal Website: www.nrjbe.in

5.	Non-availability of Spare Parts	50	83.33	04
6.	Software Issue	48	80.00	05
7.	Build Quality Issue	25	41.67	07

Source: Field study

The table clearly shows that High Price (96.67%) is the most critical issue faced by electric scooter users, followed closely by High Charging Time (91.67%) and Less Mileage Range (86.67%). These top three problems are directly related to economic and functional performance, suggesting that affordability and practicality remain major barriers for electric scooter adoption.

Additionally, issues such as Non-availability of Spare Parts (83.33%) and Software Problems (80%) indicate weaknesses in after-sales support and technological stability. In contrast, High Waiting Period for Service (50%) and Build Quality Issues (41.67%) were less frequently reported, implying that while they exist, they are not as widespread or severe as cost and performance concerns.

The analysis indicates that most users experience economic and performance-related challenges with electric scooters, particularly high purchase costs, long charging times, and limited mileage. After-sales concerns like spare parts and software issues also impact satisfaction. Addressing these problems through cost reduction, better battery technology, and improved service networks can enhance consumer confidence and market growth.

SWAT Analysis

Strengths	**Weaknesses**
1. a cleaner alternative to gas-powered vehicles, especially in urban settings. 2. **Cost-Effective Operation**: Electric scooters are cheaper to operate than cars or motorcycles, with lower fuel (electricity) costs and minimal maintenance needs. 3. **Convenient and Flexible**: Their small size allows for easy navigation in dense urban areas and quick, hassle-free parking, addressing last-mile transportation needs. 4. **Quiet Operation**: Electric scooters produce much less noise than traditional motor vehicles, contributing to reduced urban noise pollution.	1. less suitable for long-distance travel without frequent recharging. 2. **Battery Lifespan and Disposal**: Battery degradation over time impacts scooter performance, and disposal of batteries can pose environmental issues. 3. **Low Speed**: Electric scooters generally have lower maximum speeds, which may be insufficient for users seeking faster commutes or covering larger distances. 4. **Weather Dependence**: Scooters can be challenging or unsafe to use in adverse weather conditions, such as heavy rain, snow, or icy roads.
Opportunities	**Threats**
1. **Increasing Demand for Sustainable Transport**: Growing awareness of environmental issues drives demand for electric vehicles, positioning electric scooters as a	1. **Safety Concerns**: Electric scooters can pose safety risks for riders, especially in areas lacking proper infrastructure, such as dedicated bike lanes. 2. **Regulatory Challenges**: Governments

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Journal Website: www.nrjbe.in

sustainable alternative. 2. **Urban Mobility Solutions**: Many cities are encouraging electric scooter use to reduce congestion and improve air quality, potentially providing incentives or creating dedicated lanes. 3. **Technological Advancements**: Ongoing improvements in battery technology could enhance range and lifespan, making electric scooters more practical for a wider range of users. 4. **Growth in Sharing Economy**: The rise of scooter-sharing programs in cities worldwide opens new business models, allowing users to rent scooters for short-term, on-demand transportation.	may impose restrictions on electric scooter use due to concerns over safety, sidewalk clutter, or environmental impact from discarded batteries. 3. **High Competition**: The market is becoming increasingly competitive, with numerous manufacturers and shared mobility companies, potentially driving down prices and profit margins. 4. **Battery Supply Chain Issues**: Reliance on lithium and other rare materials for batteries can lead to supply chain vulnerabilities, impacting costs and availability.

This SWOT analysis shows that electric scooters have strong potential to contribute to sustainable urban transportation, though overcoming challenges in safety, battery technology, and regulation will be essential to their long-term success.

CONCLUSION

A cost comparison between electric and conventional petrol bikes revealed that e-bikes offer notable economic advantages, particularly at higher daily usage. Among electric brands, Ola S1 Pro is the most cost-effective, with total monthly costs ranging from ₹4,404.11 (20 km/day) to ₹4,740.11 (60 km/day), followed by TVS iQube. The Ather 450X incurs the highest total cost due to higher fixed expenses, while petrol bikes below 120 CC have steeply rising running costs, making e-bikes more economical for extended usage. Analysis of mean values from the 5-point Likert scale indicated that Mileage Range (4.11) and Price (4.08) are the most influential factors in consumers' purchase decisions. Speed (4.05) and Brand Name (3.85) also play a significant role, reflecting the importance of performance and reputation. Warranty (3.96) is moderately valued, while factors such as Resale Value (3.26), Availability of Spare Parts (3.41), and Other Special Features (3.50) have minimal influence. The ANOVA test confirms that practical and performance-related aspects—particularly mileage, price, and speed—have the strongest influence on purchase decisions, whereas secondary or long-term considerations play a minor role. Overall, the study demonstrates that economic benefits, performance, and brand perception dominate consumer preferences, while environmental and warranty factors are moderately important, highlighting the practical priorities guiding e-bike adoption.

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