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**Research Paper**

# The Growth Pattern and Spatial Distribution of E-Rickshaw in Northern India during 2016-2025

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**ARTICLE DETAILS**

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**ABSTRACT**

The study examines the growth and spatial distribution of (passenger) e-rickshaw registrations in Northern India from 2016 to 2025, employing a descriptive and analytical design. The analysis is based entirely on secondary data obtained from the VAHAN Dashboard of the Ministry of Road Transport and Highways (MoRTH). State-wise registration trends are assessed through percentage-share analysis and graphical representation, while long-term growth is measured using Compounded Annual Growth Rate (CAGR). Furthermore, a CAGR-based forecasting model is applied to projects for e-rickshaw registration up to 2035, and manufacturer-wise analysis identifies the top ten e-rickshaw manufacturers across the northern states. The findings reveal substantial interstate variation in adoption and growth patterns. Uttar Pradesh dominated total registration, reflecting widespread diffusion and large market size, whereas Punjab records the highest CAGR, indicating rapid expansion from a low base. Haryana and Uttarakhand show steady growth, while Delhi exhibits slower growth despite high absolute registrations, suggesting market saturation. Manufacturer analysis indicates both concentrated and competitive market structures across states, with a few manufacturers consistently leading registrations.

## 1. Introduction:

The global three-wheeler (3W) market is largely dominated by China and India, which together account for over 90% of the total sales across both electric segments. While the share of electric three-wheeler in China has remained below 15% over the three years, India surpassed China in 2023 to become the largest market for electric three-wheeler worldwide and continued to lead in 2024. In 2024, India recorded nearly 7,00,000 electric three-wheeler sales, reflecting close to 20% year-on year growth. This expansion pushed the total share of electric three-wheeler sales to a historic high of 57%, representing an increase of three percentage points compared to the previous year. (Oskaras Alsauskas; Giovanni Andrean; Elizabeth Connelly, 2025).

This growth trend has been supported by increasing government budgetary allocations, which rose from Rs.4,434.92 crore in 2024-25 (revised estimates) to Rs.5,322 crore in the Union Budget 2025-26. This represents an increase of about 20 % compared to the previous year. (Vignesh Radhakrishnan; Nitika Francis; Sambhavi Parthasarathy; Samreen wani, 2025)

The word rickshaw originates from the Japanese term *jinriksha*, in which *Jin* means human, *riki* refers to power and *sha* denotes a vehicle, together meaning "human-powered vehicles". Rickshaws are believed to have been first developed in Japan in 1869 by Isumi Yosuke, Suzuki Tokujiro, and Takayama Kosuke. In India, rickshaws were introduced in Calcutta in 1880 by

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Chinese traders, initially for carrying goods. In 1914, the Chinese community formally approached the government regarding matter to passenger operations. (Choudhary, 2015).

The development of rickshaws in India has undergone several stages, beginning with hand-pulled rickshaws, which were later replaced by cycle rickshaws, and subsequently by motorization auto-rickshaw. With rapid urbanization, rising traffic congestion, and increasing levels of air pollution, conventional fuel-based modes have posed serious environmental challenges. In this context, electric rickshaws have posed serious environmental challenges. In this context, electric rickshaws have emerged as a cleaner and more sustainable alternative, offering an effective solution to reduce urban pollution while supporting eco-friendly mobility in cities.

*1.2 Research Problem Statement:*

E-rickshaws have become one of the most popular and widely used modes of last-mile connectivity across India. Very few studies have examined the expansion of the e-rickshaw market across different states over the years. Most existing research does not analyze long-term registration trends over the years, identify leading manufacturers, or compare the evolution of the e-rickshaw (passenger) segment among different northern states of India.

Additionally, no study has accurately calculated the Compounded Annual Growth Rate (CAGR) of e-rickshaw registration or projected the market's growth over the next decade using the available data on the VAHAN dashboard.

The gaps mentioned above specify that there is a need for a detailed, data-driven study that explores:

- How has it changed from 2016 to 2025 in the northern region?
- Which manufacturer dominates the market?
- How adoption patterns vary across northern states, and
- How is the market expected to grow in the future?

*1.3 Purpose of the Study:*

- The study aims to understand how the e-rickshaw market has grown and changed in northern India between 2016 and 2025. It examines the registration trends, compares the contribution of each northern state, identifies the major manufacturers/makers, and measures overall growth through Compounded Annual Growth Rate (CAGR). The study also uses past registration data to forecast how the market may expand in the upcoming 10 years. Overall, it provided a simple, data-based picture of the market's evolution and future potential.

*1.4 Objectives of the Study:*

- To describe the contribution of each Northern Indian State to E-Rickshaw (Passenger) registrations from 2016 to 2025, presenting both absolute registration numbers in tabular form and the percentage relative share of states through graphical representation.
- To analyze the growth pattern of E-Rickshaw (Passenger) Registrations across the Northern Indian States from 2016 to 2025 using the Compounded Annual Growth Rate (CAGR).
- To identify the top 10 e-rickshaw manufacturers/makers in each northern state based on registrations
- To forecast e-rickshaw registration growth for each state up to 2035 using simple CAGR-based forecasting.

## 2. Review of Literature:

**Choudhary, 2015:** Examine the historical evolution of rickshaws from their Japanese origin to their widespread adoption in India, emphasizing their transformation from elite transport to a mass urban mobility solution. The study highlights the rickshaw's socio-economic importance as a primary livelihood for migrant and informal workers, its cultural embeddedness in Indian cities, and its role in facilitating affordable short-distance travel. It further discusses policy debates surrounding traffic congestion, labour exploitation and urban sustainability, documenting technology transitions from hand-pulled rickshaw to cycle-based and improved eco-friendly models as responses to changing urban, environmental, and social demands.

**Architects, 2022:** The study by ICLEI Delhi employs a stakeholders-based survey approach, collecting primary data from e-rickshaw drivers and owners to examine operational, regulatory, and socio-economic conditions. Using descriptive and percentage-based analysis, the study assesses registration, licensing, subsidy access, insurance coverage, vehicle age, route length, and income levels. The findings highlight the growing role of e-rickshaws in last-mile connectivity alongside persistent regulatory gaps, demonstrating the usefulness of stakeholder surveys for evaluating informal mobility systems in the urban context.

**Singh S. , 2014:** The study on battery-operated e-rickshaws in Delhi adopts a descriptive research design based on primary survey data collected from rickshaw drivers and operators. The methodology focuses on capturing operational patterns, vehicle specifications, charging and battery usage practices, income levels and compliance with regulatory norms through structured questionnaires. Using descriptive and percentage-based analysis, the study evaluates the functioning of e-rickshaw as a last-mile transport mode and source of informal employment. Methodologically, it provides micro-level

empirical evidence on the operational challenges and infrastructural gaps affecting the sustainable integration of e-rickshaws into the urban system.

**Singh S. , 2024:** The study adopts a descriptive and analytical approach to examine the role, growth, technical specifications, and performance of e-rickshaws in India. It relies on secondary data, including VAHAN registration statistics and government-approved technical standards. The methodology involves analyzing constructional, motor and battery specifications, evaluating performance using indicators such as driving range, speed, energy consumption, trip efficiency, and operating cost, and conducting a comparative assessment of major e-rickshaw modals operating in India. The findings indicate rapid growth and increasing relevance of e-rickshaw for last-mile connectivity, while highlighting constraints related to battery technology, charging infrastructure, financing cost, and regulatory enforcement.

**Md. Ashrafuzzaman Pramanik; M. Shafiq-Ur Rahman; Ashraf Uddin Fahim; Mohammad Mizanur Rahman, 2024:** The study investigates the prospects and challenges of the e-rickshaw as an informal para-transit mode in Rangpur City, Bangladesh, adopting a primary-data-driven research design. Data were collected through traffic volume surveys, structural questionnaire interviews with e-rickshaw drivers and users (400 samples at 95% confidence level), Focused Group Discussion with e-rickshaw unions, and Key Informant Interviews with local government and transport authorities. Both economic and service-quantity dimensions were analyzed, including income-investment ratios, operating and maintenance costs, depreciation, and user perception using RIDIT analysis.

## 3. Research Methodology:

The study applies a descriptive and analytical methodology to investigate the evolution, growth patterns, and regional distribution of the e-rickshaw market in northern India. Considering the partially informal and fragmented nature of this sector, the methodology prioritizes the use of dependable, structured secondary data to support accurate and meaningful analysis.

### *3.1 Study Area:*

The research focuses on the northern region of India, where e-rickshaws are a major mode of last-mile transportation. The states included are:
*Delhi, Uttar Pradesh, Haryana, Punjab, Rajasthan, Uttarakhand, Himachal Pradesh and Jammu and Kashmir.*

*Multiple analytical techniques are used to interpret the data:*

- **Percentage Share Analysis:** to measure each state's contribution to total registrations from 2016 to 2025.
- **Doughnut Charts:** to depict the overall market share of states.
- **Manufacturer/Maker Ranking Charts (bar graphs)** to identify the top 10 makers in each state.
- **Compounded Annual Growth Rate (CAGR):** to measure long-term growth in each state, the Compounded Annual Growth Rate (CAGR) is calculated using

$$\text{Compound Annual Growth Rate (CAGR)} = \left(\frac{\textit{Ending Value}}{\textit{Beginning Value}}\right)^{1/n} - 1$$

Here: **Ending Value** represents the Latest year e-rickshaw registration (2025)
**Beginning Value** represents the Initial year of e-rickshaw registration (2016)
**n** = number of years between the first and the Last year.

CAGR is calculated once per state for the entire period, not on a year-by-year basis. It provides a smooth measure of long-term growth.

- **Forecasting Method:**
  **Compounded Annual Growth Rate-based forecast**
  **Future Value** = $\mathbf{Vf \times (1+CAGR)^t}$
  Here, **Vf** = Last Known Value (2025)
  **t** = Number of years ahead

  Future e-rickshaw registrations were forecasted using a CAGR-based projection model with 2025 as the base year.
  A CAGR-based projection model is applied to estimate the cumulative growth over 10 years, avoiding short-term fluctuations and focusing on overall expansion trends.
  The present study captures the long-term average growth trajectory of e-rickshaw registration rather than year-to-year fluctuation.

### ***3.2** Research Design:*

The study employs a descriptive research design to systematically present factual information on the growth trends, market share distribution, and dominance of e-rickshaw manufacturers across the northern states of India, utilising registration data from 2016 to 2025. Alongside this, an analytical approach is employed to calculate the Compounded

Annual Growth Rate (CAGR) and to forecast future registration for the year 2035. The integration of descriptive and analytical methods enables a comprehensive understanding of the evolving structure and growth dynamics of the e-rickshaw market.

**3.3** *Nature of Data:*

The study is entirely on **secondary data**, which has been collected from the **Vahan Dashboard** developed by the **Ministry of Road Transport and Highways (MoRTH)**. The dashboard offers authentic and up-to-date information on vehicle registrations across all Indian states. For this study, data related specifically to e-rickshaw (passenger) registration have been extracted. The period of analysis spans from 2016 to 2025, allowing for a comprehensive evaluation of long-term market behaviour, annual variations, and emerging growth patterns. The reason for the selection of 2016 is that the Motor Vehicle (Amendment) Bill, 2015, which defines e-rickshaws and e-carts, along with the information for registering vehicles, is not available in certain northern states.

## 4. Data Analysis & Interpretation:

This section presents a detailed analysis of the e-rickshaw registration trends, market structures, and manufacturer/maker distribution across the northern region of India from 2016 to 2025. The analysis is based entirely on secondary data sourced from the Vahan Dashboard and supported with charts, tables, and comparative assessments. The interpretation aims to provide a clear understanding of how the market has evolved over the past decade and how different states and manufacturers have contributed to its growth. The year-wise registration data for each northern state is analysed to identify growth patterns over the 10 years. Stacked bar charts were used to depict the rise in e-rickshaw registrations visually.

**Table 1:** State-Wise Share of E-Rickshaw Registrations in Northern India

| States / Years | DL | HR | UP | UK | PB | RJ | HP | J&K |
|---|---|---|---|---|---|---|---|---|
| **2016** | 21583 | 965 | 15190 | 1150 | 126 | 4504 | N.A. | N.A. |
| **2017** | 17381 | 2184 | 40246 | 4229 | 134 | 4058 | N.A. | 4 |
| **2018** | 19389 | 2916 | 50020 | 4783 | 80 | 2896 | N.A. | N.A. |
| **2019** | 19745 | 3501 | 50846 | 5206 | 451 | 4320 | N.A. | N.A. |
| **2020** | 8097 | 2022 | 28473 | 2071 | 598 | 2904 | 150 | 1 |
| **2021** | 11745 | 3617 | 57317 | 3698 | 1156 | 7384 | 8 | 9 |
| **2022** | 13611 | 10509 | 131337 | 8848 | 5811 | 17863 | 11 | 2358 |
| **2023** | 17546 | 16400 | 204839 | 8952 | 14023 | 22427 | 17 | 5033 |
| **2024** | 27799 | 13705 | 200163 | 8114 | 18416 | 16354 | 28 | 3037 |
| **2025** | 41887 | 9764 | 157587 | 5569 | 9805 | 10421 | 20 | 651 |

*Note: DL= Delhi; HR=Haryana; UP=Uttar Pradesh; UK= Uttarakhand; PB= Punjab; RJ=Rajasthan; HP=Himachal Pradesh; J&K=Jammu & Kashmir. Data sourced from Vahan Dashboard, Ministry of Road Transport and Highways (MoRTH). N.A. indicates non-availability of data.*

The table presents the state-wise absolute number of e-rickshaw registrations across the major northern states of India from 2016 to 2025. The table highlights the distinct phases of growth, decline and acceleration in e-rickshaw registration across India over the study period.

**Delhi (DL)** shows an overall upward trend, rising from 21,583 registrations in 2016 to 41,887 in 2025. However, a temporary decline is visible between 2016 and 2020 (falling to 8,097 in 2020), likely due to pandemic-related disruptions, followed by a strong recovery after 2021.

**Uttar Pradesh (UP)** records the most significant and sustained increase, growing sharply from 15,190 in 2016 to 1,57,587 in 2025. After minor fluctuations in the early years, registrations accelerate markedly after 2020, indicating rapid diffusion across the state.

**Haryana** exhibits a gradual but consistent rise, increasing from 965 registrations in 2016 to 9,764 in 2025, with steady year-on-year growth except for a slight slowdown around 2020.

**Uttarakhand (UK)** shows moderate growth with fluctuations, increasing from 1,150 in 2016 to 5,569 in 2025. Registrations peak around 2019, decline slightly during 2020-21 and recover thereafter.
**Punjab (PB)** experienced a sharp late-period expansion, rising from a very low base of 126 registrations in 2016 to 9,805 in 2025. Growth is especially pronounced after 2021, indicating delayed but rapid registration.
**Rajasthan (RJ)** demonstrates an uneven pattern, declining from 4,504 in 2016 to 2,904, followed by a strong increase to 10,421 in 2025, reflecting recovery-driven growth.
**Himachal Pradesh (HP)** and Jammu & Kashmir **(JK)** show minimal registrations in the initial years, with data becoming available only after 2020. Although absolute numbers remain low (20 in HP and 651 by 2025), the gradual rise suggests early-stage market entry

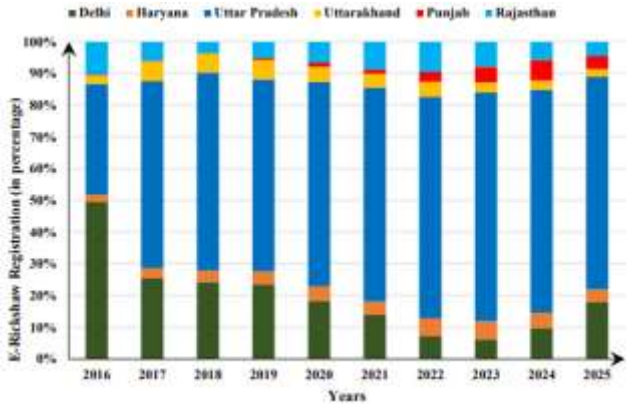


**Fig 1:** Year-wise Percentage Share of E-Rickshaw across Northern States
***Note:*** *Data sources from Vahan Dashboard, Ministry of Road Transport & Highways, (2016-2025); HP and J&K excluded from graph due to ineligible & inconsistent registration*

In **2016,** Delhi dominated with (48-50%), followed by Uttar Pradesh (35-38%); other states had marginal shares.
**2016-2017:** A major shift occurred as Delhi's share declined by (22-25%), while Uttar Pradesh's share rose sharply by (25-30%), establishing regional dominance.
**2017-2019:** Uttar Pradesh maintained a stable high share (62-65%), while Delhi stabilised at (25-27%); other states remained below (6%).
**2020-2021:** Pandemic years intensified concentration, with Uttar Pradesh peaking at (68-70%) in 2021 and Delhi falling to (15-18%).
**2022:** Delhi reached its lowest share (8-10%), while Uttar Pradesh continued to dominate at (65-67%).
**2022-2025:** Gradual diversification emerged-Uttar Pradesh's share declined by (5-7%) to (60-62%), while Delhi recovered to (18-20%); Punjab showed the fastest late growth (5-6%)

**Share of Northern States Registration of E-Rickshaw (From 2016-25):**
The pie chart illustrates a highly concentrated distribution of e-rickshaw registrations in Northern India from 2016 to 2025. Uttar Pradesh accounts for the largest share (66%), followed by Delhi (14%), while Haryana (5%), Punjab (4%), Rajasthan (3%), and Jammu & Kashmir (1%) remain marginal, reflecting slower adoption in hilly regions. Overall, the distribution underscores uneven regional adoption, dominated by a few populous states, highlighting the need for region-specific policy interventions to ensure balanced growth.† After examining absolute registration trends and percentage contributions, the study applies the Compounded Annual Growth Rate (CAGR) to assess the long-term growth performance of e-rickshaw registrations across northern Indian states during 2016-2025. CAGR measure long-term growth, providing standardized basis for interstate comparison.

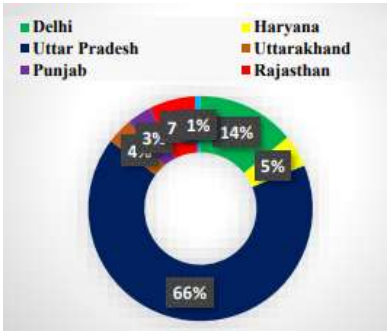


**Fig 2:** Overall Share of Northern States in E-Rickshaw Registration

† Author's calculation based on raw data obtained from the VAHAN Dashboard (MoRTH)

**Table 2:** Compounded Annual Growth Rate:

| States | 2016 | 2025 | CAGR (%) |
|---|---|---|---|
| **Delhi** | 21583 | 41887 | 7.65 |
| **Haryana** | 965 | 9764 | 29.32 |
| **Uttar Pradesh** | 15190 | 157587 | 29.68 |
| **Uttarakhand** | 1150 | 5569 | 19.16 |
| **Punjab** | 126 | 9805 | 62.23 |
| **Rajasthan** | 4504 | 10421 | 9.77 |
| **Himachal Pradesh** | N.A. | 20 | N.A. |
| **Jammu & Kashmir** | N.A. | 651 | N.A. |

***Source:*** *Based on VAHAN Dashboard Data (MoRTH), author analysis*

Considering the research objective of examining the growth pattern of e-rickshaw registrations across northern states, the CAGR analysis for 2016-2025 reveals market inter-state variation. Punjab records the highest growth rate (62.23%), reflecting rapid expansion from a low initial base, while Uttar Pradesh (29.68%) and Haryana (29.32%) exhibit strong and sustained growth, driven by rising demand for last-mile electric mobility. Uttarakhand shows moderate growth (19.16%), indicating steady but geographically constrained registration. In contrast, Delhi records a comparatively low CAGR (7.65%) despite high absolute registrations, suggesting market maturity and saturation during the study period. Rajasthan's growth remains modest (9.77%), pointing to gradual and uneven diffusion. CAGR is not computed for Himachal Pradesh and Jammu & Kashmir due to the absence of base-year data, indicating delayed market entry. Overall, the findings confirm that states with lower initial penetration experienced higher growth, while early adopters show slower proportional expansion, underscoring an uneven yet progressive evolution of the e-rickshaw market in Northern India.

**CAGR-Based Forecasting of E-Rickshaw Registration:**

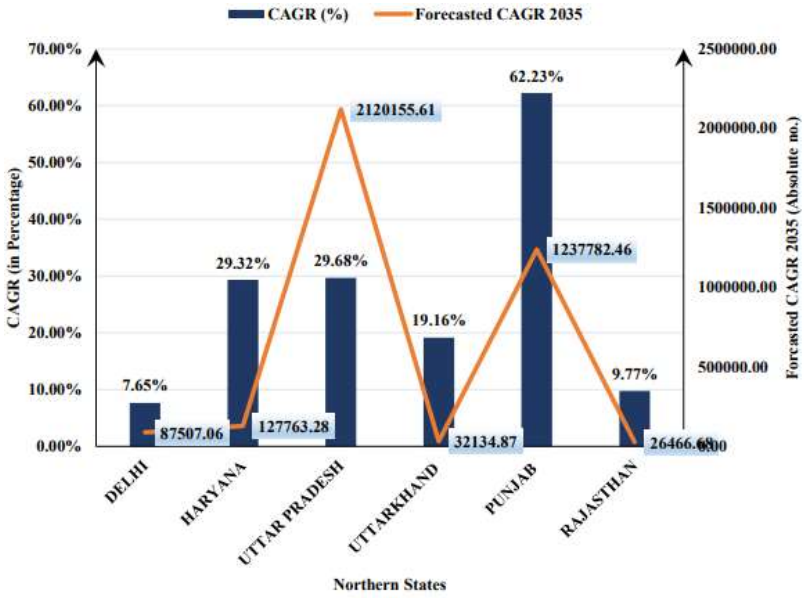


**Fig. 3:** CAGR and Forecasted E-Rickshaw Registrations in Northern States (up to 2035)
***Source:*** *VAHAN Dashboard (MoRTH); author's analysis and projection*

The above chart simultaneously shows CAGR and forecasting e-rickshaw registrations up to 2035, highlighting both growth momentum and the expected increase in registrations across major northern states. Punjab, with the highest CAGR of (62.23%), reflects the sharpest acceleration in adoption and is expected to witness a substantial increase in registration of **12,37,782.46** by 2035, positioning it as a high-growth market. Uttar Pradesh records a strong CAGR of (29.68%), and owing to its large existing base, is projected to experience the largest absolute increase of **21,20,155.61** registrations, thereby dominating the Northern region in terms of future volume.

Haryana, with a comparable CAGR of 29.32%, is also expected to register a notable rise in registrations of **1,22,263.28**, indicating steady and sustained expansion. Uttarakhand shows a moderate CAGR of 19.16%, corresponding with a moderate increase in forecasted registrations of **32,134.87**, suggesting gradual market development. In contrast, Rajasthan (9.77%) and Delhi (7.65%) exhibits relatively low growth rate, which translate into smaller increases of in registrations by 2035, reflecting slower expansion of **26,466.68** and **87,507.06** respectively which translate into smaller increase in registrations by 2035.

Overall, the chart indicates that while Punjab leads in growth intensity, Uttar Pradesh contributes the highest increase in absolute registrations, emphasizing that both CAGR and forecasted growth in registration numbers are crucial for understanding future e-rickshaw adoption in the Northern region.

*The forecasting analysis employs CAGR derived from registration data (2016-2025). States with incomplete initial-year data, namely Himachal Pradesh and Jammu & Kashmir, are excluded to ensure robustness and reliability of projections.*

**Manufacturer/Maker-wise Analysis (Top 10 Makers)**

The top 10 Manufacturers from 2016 to 2025 were identified using registration counts. Bar Charts were used to present maker-wise performance across different northern states.

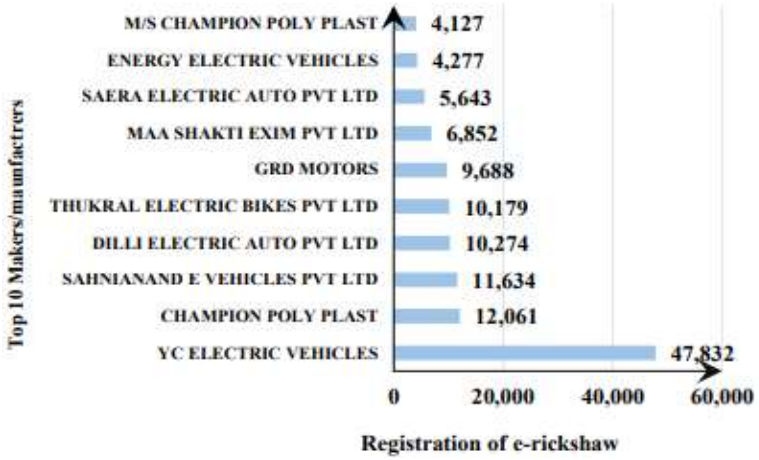


**Fig 4:** Delhi 10 Makers from 2016 to 2025

**1. Delhi:** The bar diagram depicts the manufacturer/maker-wise distribution of e-rickshaw registration in Delhi from 2016 to 2025, based on the top ten makers considered for the study.YC Electric Vehicles dominates the market with (47,832) registrations, followed by Champion Poly Plast (12,061) and Sahnianand E Vehicles Pvt. Ltd. (11,634), which rank second and third, respectively. These three manufacturers/makers together account for a substantial share of total registrations, indicating strong market concentration. The remaining seven manufacturers-Dilli Electric Auto Pvt. Ltd., Thukral Electric Bikes Pvt. Ltd., GRD Motors, Maa Shakti Exim Pvt. Ltd., Saera Electric Auto Pvt. Ltd., Energy Electric Vehicles and MS Champion Poly Plast record relatively lower registrations and collectively form a fragmented segment with limited individual dominance.‡

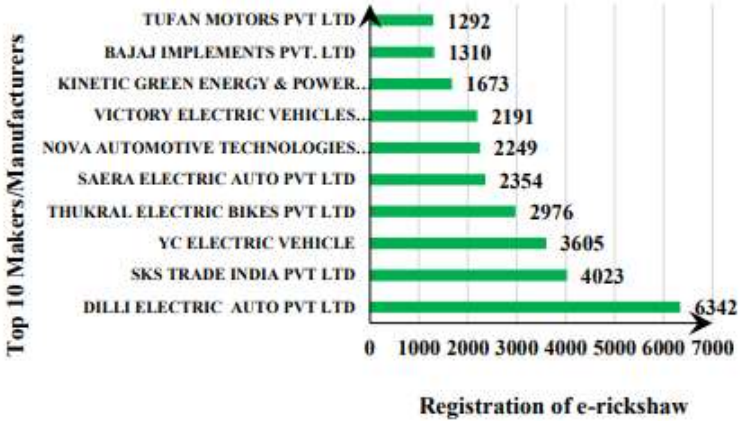


**Fig 5:** Haryana Top 10 Makers from 2016 to 2025

**2. Haryana:** The diagram illustrates the distribution of e-rickshaw registrations across the top ten manufacturers in Haryana during 2016-2025. The registration pattern shows a clear hierarchy among manufacturers. Dilli Electric Auto Pvt. Ltd occupies the leading position §with the highest registrations, followed by SKS Trade India Pvt. Ltd. and YC Electric Vehicle. The noticeable gap between the leading firm and lower-ranked manufacturers indicates the presence of dominant players, but the overall spread suggests less concentration than metropolitan markets. Mid-ranked manufacturers such as Thukral Electric Bikes Pvt. Ltd. and Saera Electric Auto Pvt. Ltd. reflect steady but limited market penetration, while the remaining firms record comparatively low registrations.

‡ 1. Source: Vahan Dashboard, (MoRTH); data compiled and analysed by the author; Analysis of top 10 Manufacturers by registration volume.
§ Source: Vahan Dashboard, (MoRTH); Analysis of top 10 Manufacturers by registration volume.

**3. Uttar Pradesh:** The diagram below shows the manufacturer-wise distribution of e-rickshaw registration in Uttar Pradesh from 2016-2025.

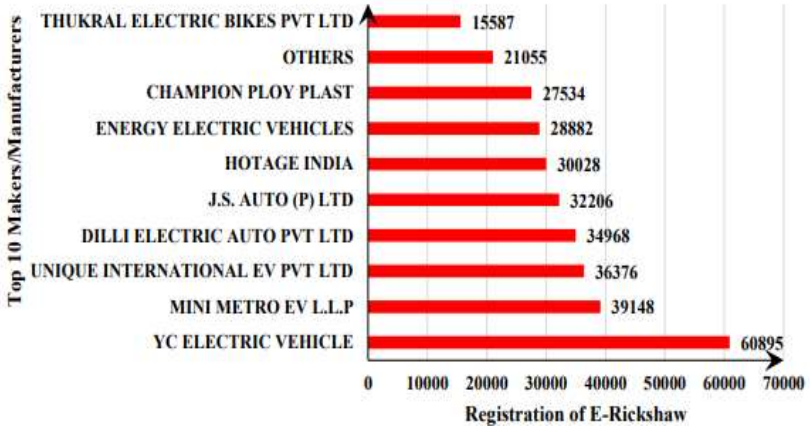


**Fig 6:** Uttar Pradesh Top 10 Makers from 2016 to 2025
***Source:*** *Vahan Dashboard (MoRTH), data compiled and analysed by author.*

YC Electric Vehicle leads the market with (60,895) registrations, followed by Mini Metro EV LLP (39,148) and Unique International EV Pvt. Ltd. (36,376). These top manufacturers indicate strong competition rather than single-firm dominance. Several mid-level players-Dilli Electric Auto (P) Ltd., J.S. Auto (P) Ltd., and Hotage India also record substantial registrations, reflecting a broad and competitive market base. The presence of the "Other" category further indicates participation by multiple smaller manufacturers. Overall, Uttar Pradesh exhibits a high-volume and relatively less concentrated e-rickshaw market, supported by diversified manufacturer presence and widespread registration.

**4. Uttarakhand**: In the below-mentioned graph, YC Electric Vehicles leads the Market with 9,043 registrations, followed by

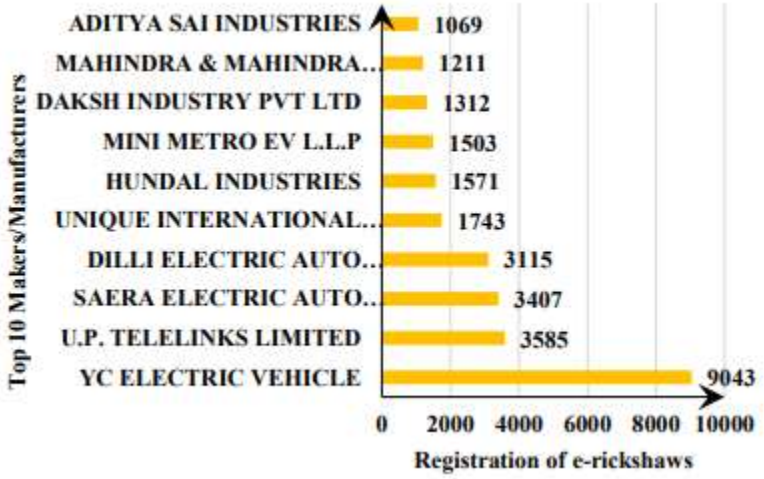


**Fig 7:** Uttarakhand Top 10 Makers from 2016 to 2025

U.P. Telelinks Limited (3,585), Saera Electric Auto Pvt. Ltd. (3,407), and Dilli Electric Auto Pvt. Ltd. (3,115), which together account for a substantial share of total registrations. Lower contributing Manufacturers-Unique International EV Pvt. Ltd., Hundal Industries, Mini Metro EV LLP, Daksh Industry Pvt. Ltd., Mahindra & Mahindra Limited, and Aditya Sai Industries record comparatively low registrations, each remaining below 2,000 units. Their limited contribution indicates a smaller operational scale, niche market presence, or constrained demand within the state[**]

**5. Punjab:** In Punjab, Nova Automotive emerges as the leading manufacturer with 3,027 registrations, followed closely by All fine. Industries Pvt. Ltd 2,934 and Mini Metro EV LLP 2,820. The relatively narrow differences among the top three indicate a competitive and balanced market structure, rather than dominance by a single firm. Mid-level manufacturers such as Dilli Electric Auto Pvt. Ltd. 2,696, Zeoplus Axis India Pvt. Ltd. 2,222 and Unique Enterprises 2,134 contribute steadily, reflecting consistent market participation.[††]. Lower-contributing manufacturers include Saera Electric Auto Pvt. Ltd., Vimal Universal Trade Pvt. Ltd., Best Way Agencies Pvt. Ltd., Best Way Agencies Pvt. Ltd., and Hotage India, which record registrations below 1,700 units each, indicating smaller operational scale or limited market reach.

[**] Source: Vahan Dashboard, (MoRTH); Data compiled and analysis by author, Analysis of Top 10 Manufacturers by registration volume.
[††] Source: Vahan Dashboard, (MoRTH), data compiled and analysis by author, Analysis of Top 10 Manufacturers by registration volume.

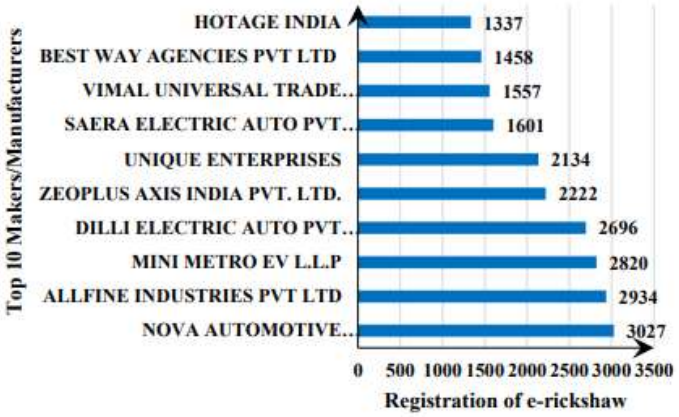


**Fig 8:** Punjab Top 10 Makers from 2016 to 2025

**6. Rajasthan:** The market shows a relatively balanced structure, with no single manufacturer exercising overwhelming dominance.

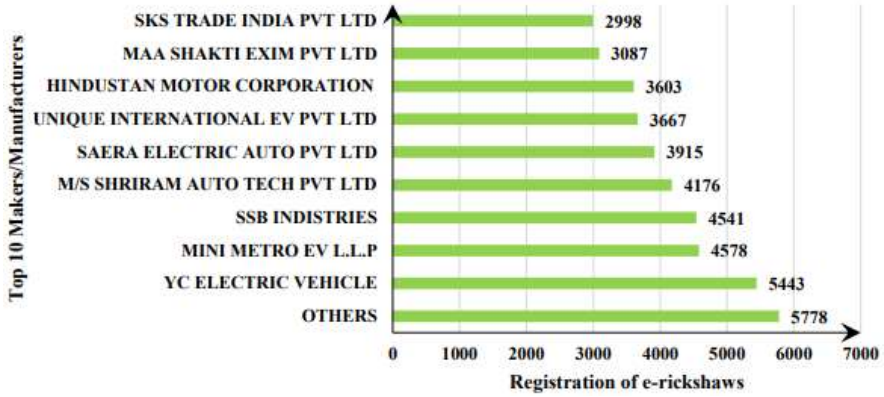


**Fig 9**: Rajasthan Top 10 Makers from 2016 to 2025
***Source:*** *Vahan Dashboard (MoRTH); data compiled and analysis by the author.*

The "Other" category records the highest registrations (5,778), indicating the presence of several smaller manufacturers collectively significantly contributing to the market. YC Electric Vehicle (5,443) and Mini Metro EV LLP (4,578) emerge as the leading individual manufacturers, followed closely by SSB Industries and M/s Shriram Auto Tech Pvt. Ltd. Mid-level manufacturers such as Saera Electric Auto Pvt. Ltd., Unique International EV Pvt. Ltd. and Hindustan Motor Corporation manufacturers, including Maa Shakti Exim Pvt Ltd. and SKS Trade India Pvt Ltd., register comparatively fewer units.

**7. Jammu and Kashmir:** The following graph presents e-rickshaw registration in Jammu & Kashmir from 2016 to 2025,


**Fig 10:** Jammu & Kashmir Top 10 Makers from 2016 to 2025
***Source:*** *Vahan Dashboard (MoRTH); data compiled and analysis by the author.*

Overall registration volumes are relatively low, indicating that the e-rickshaw market in the state is at a nascent stage. OM Balajee Automobile (India) Pvt. Ltd. Leads with (1,154) registrations, followed by YC Electric Vehicle (702) and Exide Industries Ltd. (683), suggesting a limited but emerging manufacturer presence. The remaining manufacturers, including

Saera Electric Auto Pvt., SSB Industrial Corporations, RCJ Auto Forge Pvt. Ltd., and Dilli Electric Auto Pvt. Ltd., record closely clustered and comparatively lower registrations. This narrow variation reflects an underdeveloped and evenly distributed market with no strong dominance beyond the leading firm.

**8. Himachal Pradesh:** The graph below depicts distribution of e-rickshaw among leading manufacturers in Himachal Pradesh during 2016-2025, YC Electric Vehicle clearly dominates the market with 124 registrations, followed by Mahindra Electric Mobility Ltd. (49) and Leopan Motors Pvt. Ltd. (32). These three manufacturers together account for majority of registrations, highlighting a highly concentration market structure.

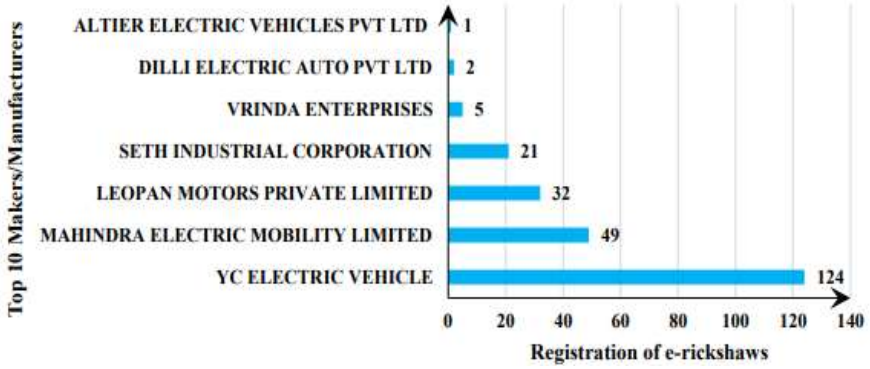


**Fig 11:** Himachal Pradesh Top 10 Makers from 2016 to 2025
***Source:*** *Vahan Dashboard (MoRTH); data compiled and analysis by the author.*

The remaining manufacturers, including Seth Industrial Corporation, Vrinda Enterprises, Dilli Electric Auto Pvt Ltd., and Altier Electric Vehicles Pvt. Ltd., contribute the marginal registrations, reflecting weak manufacturer presence.

**5. Conclusion:**
This study utilized a descriptive and analytical framework to assess the development of the e-rickshaw in Northern India from 2016 to 2025. The methodology is based on secondary data from the VAHAN Dashboard, employing percentage-based analysis, Compounded Annual Growth Rate (CAGR) computations, and CAGR-based forecasting to evaluate registration trends across the states.

**The Key findings highlight the regional variations in adoption, growth, and market structure:**
**State-wise Registration Share & Growth:**
Uttar Pradesh accounts for the largest share of registration (66%) and maintains a strong CAGR of 29.68%, which reflects both market size and vigorous expansion. Delhi contributes 14% of registrations, but exhibits a lower CAGR of 7.65%, indicating early saturation. Punjab, through represent only (4%) of total registrations, recorded the highest CAGR of 62.23%, signalling rapid recent uptake. Haryana (5%) share, 29.32% CAGR and Uttarakhand (~2-4%) share, 19.16% CAGR showed steady growth, while Rajasthan (3%) share, 9.77% CAGR.

**Forecasted Registration Growth:**
Projections to 2035 reinforce these disparities. Uttar Pradesh is expected to add over registrations, representing 21.20 lakh market dominance. Punjab is forecasted to reach approximately 12.38 lakh registrations, highlighting its high-growth trajectory. Haryana is projected to expand by around, reflecting consistent demand, 1.22 lakh while Delhi is projected to expand to 87 thousand approx.

**Manufacturer Presence:**
Manufacturer analysis revealed a distinct market structure. YC Electric Vehicles emerged as a regional leader, topping registrations in multiple states, including Delhi, Uttar Pradesh, and Uttarakhand. Markets varied from highly concentrated (Delhi, Himachal Pradesh) to more competitive and fragmented (Uttar Pradesh, Punjab, where several manufacturers, such as Mini Metro EV LLP, Nova Automotive, and Allfine Industries, compete closely.

**6. Limitations of the Study**
The study analysis solely relies on official registration data from the VAHAN Dashboard, not considering the informal segment of e-rickshaws. Secondly, the CAGR-based forecasting past linear trend, without adjusting to potential disruption. Finally, the scope is confirmed to passenger e-rickshaws, leaving out the growing e-cart freight segment.

**7. Future Scope of Study:**
The future scope includes employing mixed-method approaches, combined survey and interviews with stakeholders, drivers, owners, passengers and manufacturer gain ground-level insight. Broadening the geographical analysis to include eastern,

western, and southern India would enable a true national assessment of regional adoption patterns. Further research could also quantitatively examine the correlation between specific state-level incentives, financing programs, charging infrastructure rollout, and registration growth rates.

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