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RISE OF ELECTRONIC VEHICLES: OPPORTUNITIES AND CHALLENGES

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Abstract:

The rise of electronic vehicles (EVs) has ignited a global boom in the automotive industry. The inherent eco-friendly nature of EVs is compelling people to shift their preferences from traditional fuel-burning vehicles to battery-powered alternatives. In line with this global trend, India has set an ambitious target to achieve 100% electric vehicles on its roads by 2030. In India around 1,096 startups are related to EVs. However, a pivotal question surfaces: are Indians truly aware and prepared to embrace this transformative technology? This paper attempts to shed light on the current scenario surrounding EVs, examining the opportunities for adoption rates in the Indian market. Simultaneously, it addresses the formidable challenges that must be navigated for developing nations like India to seamlessly integrate and prosper in the era of electronic vehicles.

Keywords: Electric Vehicles (EVs), Start- ups, Awareness, Opportunities, Challenges

I. Introduction:

Electronic vehicles are changing the scenario of the automobile sector worldwide. With increase in air pollution and climate change, people are now more conscious to search for options with less harmful effects. Electronic vehicles are one of such options. Electronic vehicles are the vehicles in which rechargeable batteries are there to power the wheels, replacing gas or fuel burning engines. It not only reduces air pollution and provides scope for the sustainable development but is also a cheaper option with smooth and quiet ride. There are two primary types of Electric Vehicles:

1. **Battery Electric Vehicles:** These are the vehicles which run only on batteries which are rechargeable. They range from a scooter to 180 ton trucks. To recharge the battery, the vehicle is to be plugged in to external power source such as charging station, solar etc.
2. **Plug-in Hybrid Electric Vehicles (PHEVs)**: These vehicles have both battery motor as well as combustion engine. These vehicles have larger battery packs, which makes the

vehicle to travel larger distance only through electronic power. When the battery is exhausted it automatically shifts to the combustion engine.

In Indian market it is important to know what is the present condition regarding adoption of EVs by Indian people as well as what can be the challenges for the automobile sector. India aims to become global leader in the field of EV by 2030, around 1096 start-ups are related to EVs (OLA electric, Ather Energy, Yulu, Blu smart, Sun Mobility, Bounce etc. are some of them). This provides the automobile sector a good opportunity to grow and cherish their businesses in EVs. On the other hand, some important factors like awareness, supporting infrastructure, cost etc., are to be considered before the EV ecosystem becomes wholesome.

II. Objectives:

The objectives of the study are as follows:

1. To know the level of awareness among people regarding EVs.
2. To know the present market of EVs in India.
3. To analyse the opportunities and challenges of EVs in India.

III. Scope:

Through this study we can know the present thoughts & understanding of EVs among the students & new professionals. This study has been done in specific area; further study can be done at a large scale.

IV. Research Methodology:

This study is done to present the current condition as well as the opportunities and challenges of the EV industry. Descriptive research methodology is used for the study. Primary data is used to know the views of the people regarding EVs and data of a sample population of 102 is collected through online questionnaire. Secondary data is used to know about the current condition of the EV market. Secondary data is accumulated through online sites, articles and newspaper reports.

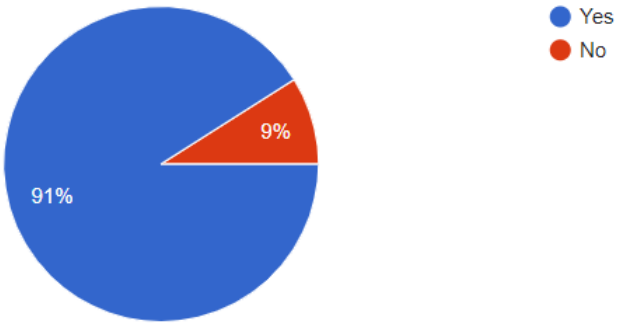
V. Limitations Of the Research:

1. Due to the time constraint sample size is small and is from specific area. The result drawn may not be generalizable at a very large scale.
2. The sample population does not include the 3 wheeler EV's riders.
3. The data are not analysed separately for each type of Electronic Vehicle.

VI. Data analysis:

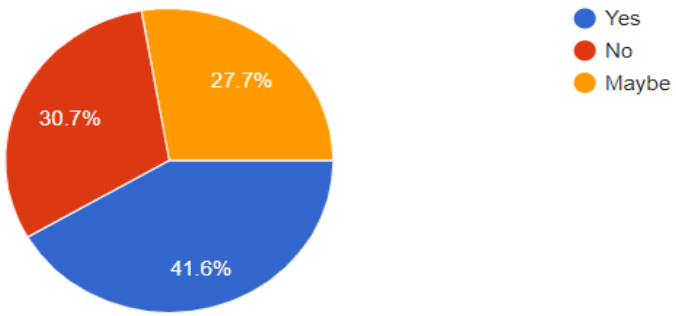
A. Based on the primary data collected through online questionnaire:

1. Awareness regarding EVs.



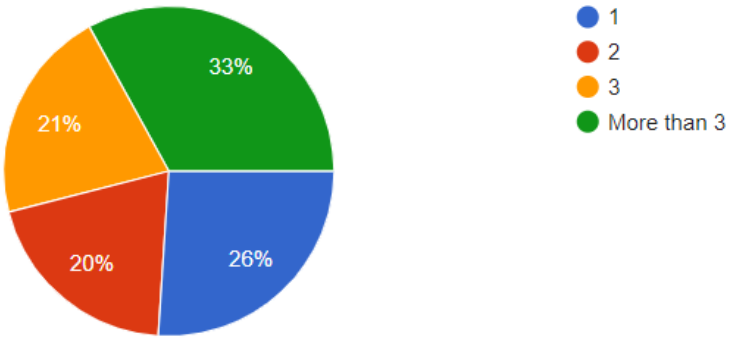
91% of the people are aware of EVs, where as 9% don't know what EV is.

2. Awareness regarding technical parts of EVs.



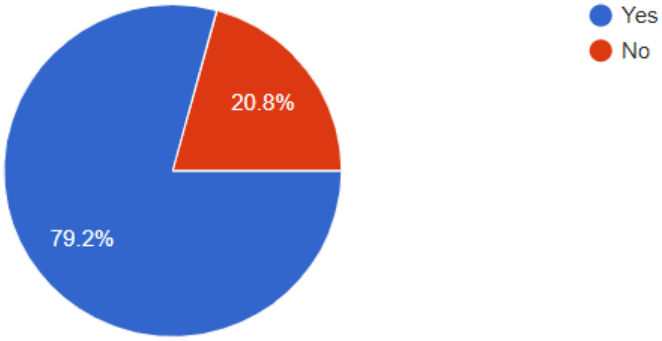
41.6% of the people know about the technical parts of the Electronic vehicles where as 30.7% are not aware of it. 27.7% of the people are not sure about the technical parts of the EVs.

3. Awareness regarding the companies producing EVs.



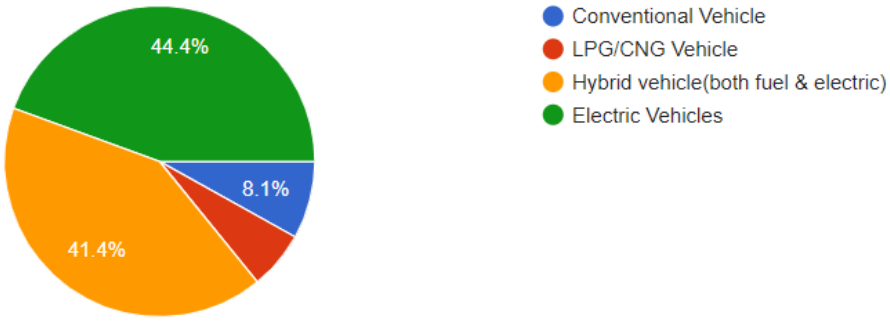
Majority of the people know more than 3 companies producing EVs, where as 26% of the people know about only one company, 21% know about three companies and 20% know about two companies which are producing EVs in the automobile industry.

4. Based on the people planning to buy vehicle in the near future



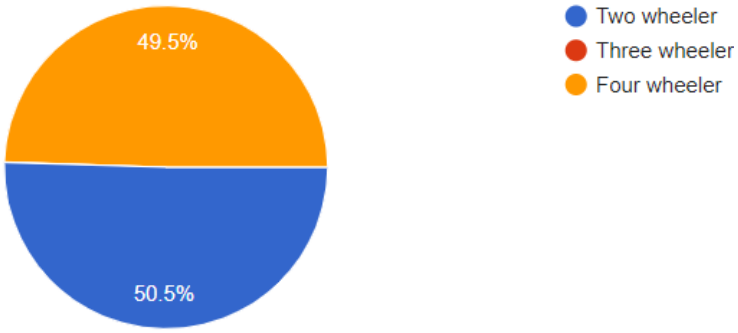
79.2% of the people are planning to buy vehicle in the near future.

5. Based on the buying preference of the people



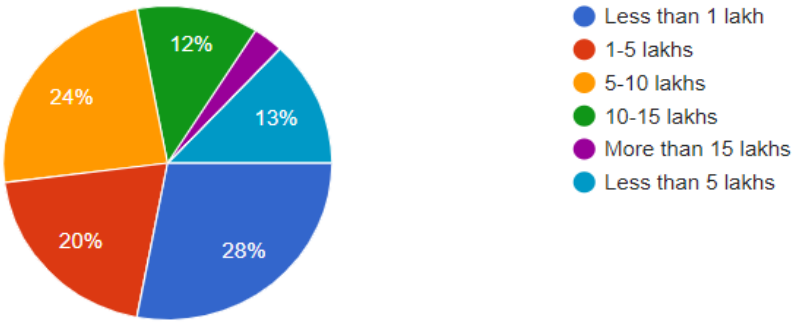
44.4% of the sample population buying preference is towards electronic vehicles, 41.4% have the preference of buying hybrid vehicle while some people have preference towards conventional as well as LPG/CNG vehicles.

6. Based on type of the vehicle



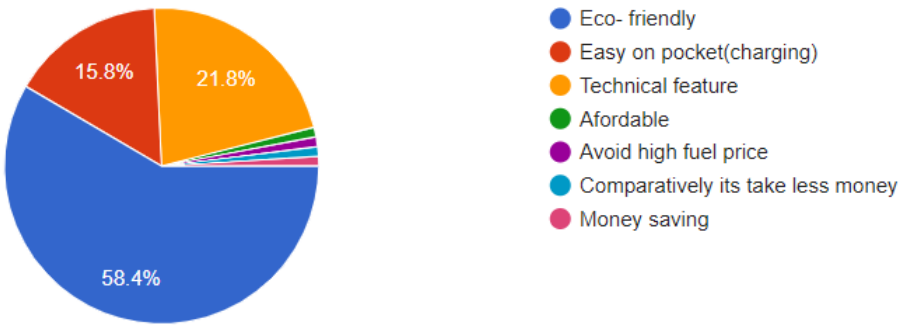
Sample population consists of only two and four wheelers vehicles users. In that majority are the two wheelers riders which is 50.5% where as 49.5% of the people are willing to buy four wheelers.

7. Based on the costing issue



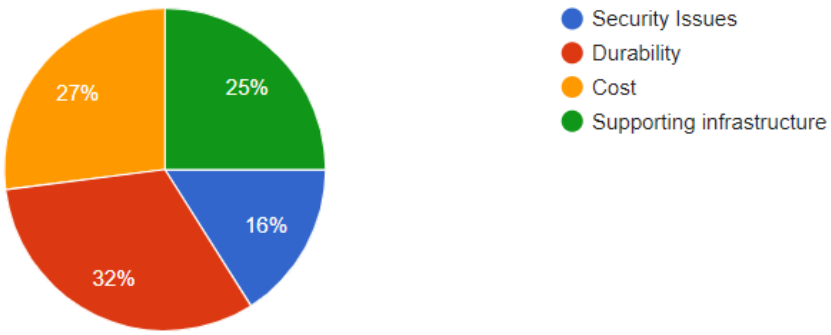
24% of the people are willing to spend less than 1lakh, 24% wants to spend 5 to 10 lakhs, and 20% wants EV in the price range of 1 to 5 lakhs where as some wants to spend 5 to 15 lakhs for buying EVs.

8. Based on the most attracting feature of EV



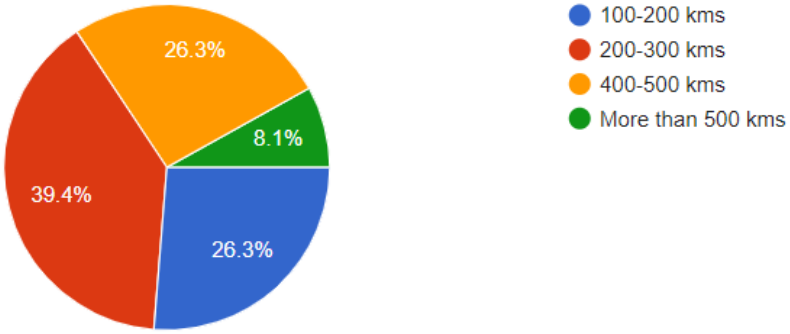
For most of the people the eco-friendly nature of EVs is attracting them, for others more or less it is easy on pocket. Meanwhile 21.8% of the people are attracted towards its technical features.

9. Based on the most discouraging feature of EV



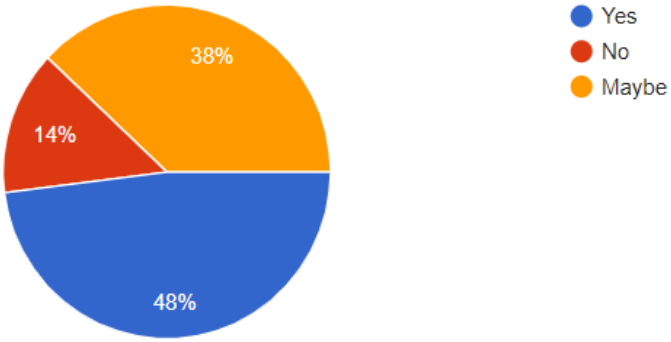
For 32% of the people durability is the issue, for 27% of the people cost is the issue, for 25% supporting infrastructure is a major concern while for rest security issue is the major concern.

10. Based on the range of the vehicles after 1 complete charge



Most of the people expect the vehicle to go between 200-300kms while 26.3% expect the range to be between 100-200kms and between 400-500kms. Some people expect it to go more than 500kms.

11. Based on the expectation of the people



48% of the people think that EV will replace conventional vehicle in the future while 14% of the people do not think so. 38% of the people are not sure about the replacement.

B. Based on the secondary data collected through online sites and reports.

Table 1: Number of EVs registered sales in India in the FY 2021-22 & FY 2022-23:

Type	Number of EVs registered		Year On Year Growth (In %)
	FY 2021-22	FY 2022-23	
2 Wheelers	2,79,564	7,79,158	179%
3 Wheelers(L3)	1,74,530	3,74,003	114%
3 Wheelers(L5)	12,498	33,378	167%
4 Wheelers	21,163	53,843	154%
Bus	1,188	1,919	62%
Others	1,267	957	24%

Source: EVreporter.com

We can observe that in both the financial years, 2 Wheelers and 3 Wheelers EVs are having maximum registered sales. Year on Year growth of the 2 wheelers is the maximum. 4 Wheelers have registered fewer sales; however its growth percentage is good as compared to 3 wheelers (L5) Vehicle. Bus and other EVs are doing comparatively less.

VII. Findings & Suggestions:

1. People are aware about Electronic vehicles but on the other hand they are lacking knowledge about its technical parts. Here, more awareness is required to be spread among people.
2. Customers who are planning to buy vehicles in the near future will prefer electric vehicles or hybrid vehicles. It indicates that the demand of EVs and hybrid vehicles will increase in the future which in turn is a good sign for the EV sector.
3. Based on the analysis of the primary as well as the secondary data we can say that the market of the two-wheeler and 3 wheelers EV is really a very huge market. Automobile companies or the startups producing EVs can consider these factors.
4. Cost is a very important factor in the Indian market. Significant number of people is willing to spend less than rupees 5lakhs for the purpose of buying EVs. It is a challenge for the industry to make the vehicles economical or to provide financing facilities to buy vehicles on easy terms.

5. Along with the cost, supporting infrastructure as well as the durability of the EVs are important variables which are to be considered. Development of charging stations in every corner of the country is a difficult task to achieve in less time period. If India wants to go complete EV by 2030, charging stations must be developed at a very fast pace. People also have doubts regarding the durability of the vehicle which is to be resolved by the EV companies.
6. People love the feature of EV being an eco-friendly option. The rising fuel prices and comparatively less electricity charges are encouraging people to think about EVs in the place of conventional vehicles.
7. The capacity of the battery to go long way after one complete charge is also an important factor to be taken into consideration. People have expectation of going more than 200kms in their electronic vehicle after one complete charge. It is a challenge for the company to meet the expectation of their customers.
8. Most of the people are expecting that EV will replace the conventional vehicle in the future. It is a green flag for the companies and the startups that people are ready to adopt EV and the market will grow in the future.

VIII. Conclusion

The rise in the sales of the electronic vehicles worldwide not only shows technology advancement but it is the need to reduce the emission of greenhouse gases. In this paper we have shown the current market scenario of the EV market and tried to find out opportunities and challenges for the automobile industry which is heading towards Electronic Vehicles. In countries like India where awareness, cost and supporting infrastructure are major challenges complete education, research programs, financing facilities for the private EV owners, development of roads as well as the charging stations can be the possible solutions. Development of charging infrastructure will surely increase the demand of EVs as because people are ready to adopt the EV in place of the conventional vehicles. The features as well as benefits of EVs will definitely cover the costing as well as other issues in the mind of the Indians. Market of EV sector will be blooming in the future specially in the case of 2 & 3 wheelers EVs. It is a good opportunity for the startups to focus mainly on the 2 or 3 wheelers vehicles. On the other hand well established automobile companies can focus on producing 4

wheelers EVs as because they will be able to manage it efficiently. At last we can say that India is having a good scope for the EVs, only there is a need of awareness and research & development by the government as well as the private manufacturers.

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X. Annexure

Questionnaire:

1. Name:

2. Age:

3. Occupation:

4. Are you aware of Electronics Vehicles:
    - Yes
    - No

5. Are you aware of the technical parts of Electronics vehicles?
    - Yes

- No
- May be

6. Are you planning to buy vehicle in the near future?
    - Yes
    - No

7. Which of the following would you prefer?
    - Conventional Vehicle
    - LPG/CNG
    - Hybrid Vehicle
    - Electric Vehicle

8. Which type of vehicle would you prefer?
    - Two wheeler
    - Three wheeler
    - Four wheeler

9. How much are you willing to spend on an Electronic Vehicle?
    - Less than 1 lakh
    - 1-5 lakhs
    - 5-10 lakhs
    - 10-15 lakhs
    - More than 15 lakhs

10. For you, what is the most attracting feature of an Electronic Vehicle?
    - Eco-friendly
    - Easy on pocket(charging)
    - Technical feature
    - Other

11. According to you, what is the most discouraging feature of buying an Electronic Vehicle?
    - Security Issues
    - Durability
    - Cost
    - Supporting infrastructure

12. What should be an appropriate range for you of an EV after one complete charge?
    - 100-200kms
    - 200-300kms
    - 400-500kms
    - More than 500kms

13. Number of EV companies you know at present?
    - 1
    - 2
    - 3
    - More than 3

14. Do you think EVs will replace conventional vehicles at some point in the future?
    - Yes
    - No
    - May be