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A Study on Perception of Consumers on E - Vehicles in Bengaluru

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Abstract: ***The emergence of EVs and technology is a constant topic of discussion around the world. The government has also raised awareness of EVs across the country and focused on reducing emissions and improving air quality, so there has always been a focus on EVs and their benefits. The purpose of this study is to give consumers a rational idea of the advent of electric vehicles. This will help educate consumers about the current scenario of EVs and their advantages over conventional vehicles.***
The data used in this study is collected by Snowball sampling of 123 respondents in an online questionnaire. A pilot study conducted before the main study also provided better insight into the market. The positive correlations found between factors point to a bright future for electric vehicles. Key factors such as reliability, smooth driving, fast charging and environmental friendliness are some of the criteria that consumers consider when choosing a vehicle. Raising awareness of electric vehicles and their benefits could also be an important step. In the future, we will be able to conduct detailed studies on the environmental impact of electric vehicles and technological progress in this area. In Bengaluru as a city, the EV industry is growing rapidly, creating jobs, reducing operating costs, and advancing technology over the years.
Keywords: E - vehicles, Bengaluru, Students, Cost - effective, Environmental effects

I. INTRODUCTION

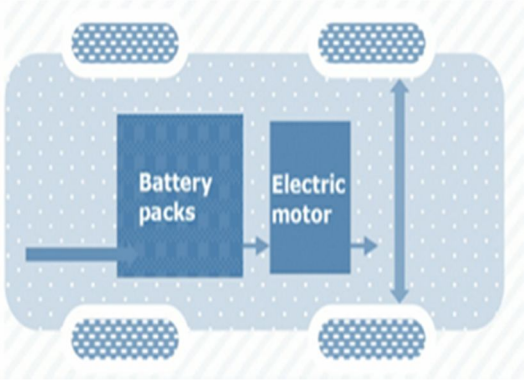
A. Concept

The concept of electric cars is said to date back to 1837. Robert Davidson built a small electric locomotive in Scotland, then Thomas Davenport built a small electric car in the United States. But at the start of the 21st century, the concept started to become more and more important. Since then, electric vehicles have continuously proved to be an absolute innovation in achieving sustainability. An electric vehicle (EV) is a vehicle that uses more than one electric motor. Instead of relying entirely on gasoline or diesel-powered internal combustion engines, electric vehicles are powered by rechargeable batteries that store energy and drive an electric motor that turns the wheels.

B. Types of Electric Vehicles

1) Battery electric vehicle (BEV)

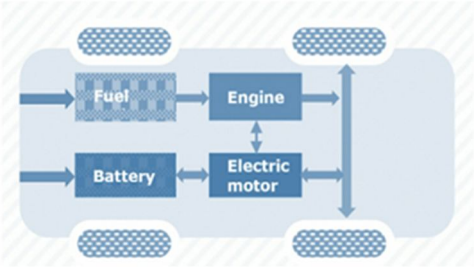
A battery-powered electric vehicle (BEV) is an electric vehicle that uses a battery as a complete energy storage medium for the vehicle's propulsion. The BEV is charged by plugging it into a power source. They are powered by large batteries that can be charged at home or at charging stations. BEVs have varying ranges depending on battery size and other factors, but are typically between 100 and 300 km on a single charge.



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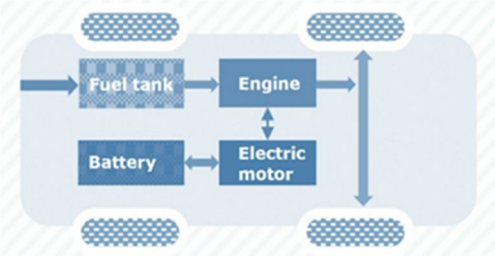
2) Plug-in hybrid (PHEV)

A hybrid electric vehicle is a combination of electric power and gasoline or diesel fuel to drive a vehicle. They can be 'plugins' or 'no plugins'. They can be charged using external power sources, such as BEVs, but they also have the option of using fuel as a backup power source when their batteries are charged less. PHEVs typically have a shorter electric-only range than BEVs, but the gasoline engine helps them keep driving when the battery is low. PHEV uses an internal combustion engine (ICE) and an electric motor. Charging the PHEV can be done from the mains and uses a slightly cleaner and cheaper electric power. The battery's energy is recharged by ICE, wheel movement or by connecting to a charging point.



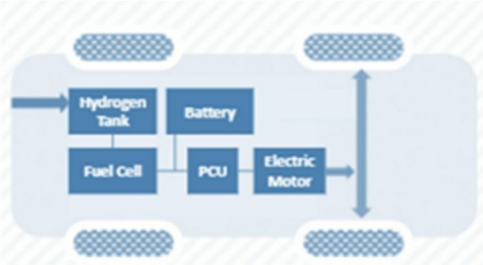
3) Hybrid (HEV)

These vehicles have both internal combustion engines and electric motors. However, the electric battery is charged only by ICE, wheel movement, or a combination of both. There is no charging connector to power the vehicle. HEVs have a shorter electric-only range than BEVs and PHEVs, but are generally better fuel efficient than petrol-only vehicles.



4) Fuel Cell Electric Vehicles (FCEVs)

These vehicles use fuel cells to convert hydrogen gas into electricity, which powers electric motors. They emit only steam and have a longer range than battery-powered electric vehicles.



In general, each type of EV has its own pros and cons depending on individual needs and preferences. Consumers should consider factors such as range, charging infrastructure, and cost when choosing the right electric vehicle for them.

C. Novelty of EVs and its Significance -

The choice of battery depends on energy density, weight and cost. Electric bicycles and low range vehicles have a single battery pack while electric cars have a large number of batteries. Traditionally, most electric vehicles have used lead-acid batteries due to their mature technology, easy availability and low cost. However, since the 1990s, battery technology has evolved significantly, many new types of batteries have been developed over the years. Recently, lithium-ion batteries and its variants are gaining acceptance due to better efficiency, reduced weight, reduced charging time, better power output, longer life and reduced impact. environment of battery disposal.

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The following four types of batteries are commonly used today in EVs:

- Lead Acid
- Nickel Cadmium (NiCd)
- Nickel Metal Hydride (NiMH)
- Lithium - ion

Lithium-ion batteries have a higher specific energy than other types of batteries. In the future, technological innovations with lithium-ion and other battery technologies are expected to result in batteries with much higher specific energy and lower costs.

Electric vehicles are on the rise due to their ability to reduce operating costs compared to older fuel-powered vehicles, as they require less maintenance and can be charged at home or at public charging stations, reducing the need for electric vehicles. to the gas station. In addition, electric vehicles emit less carbon and contribute to a cleaner environment, helping to reduce air pollution and combat climate change. Electric vehicles also benefit the environment by reducing carbon emissions and air pollution. Transport is one of the biggest contributors to greenhouse gas emissions, which is a major cause of climate change. By using electricity as a power source, electric vehicles do not emit exhaust emissions, which can significantly reduce carbon emissions and other harmful pollutants released into the atmosphere. This can help improve air quality in cities and reduce health risks associated with air pollution. In addition, the use of electric vehicles can also contribute to improving energy security. Since electric vehicles can be powered by a variety of sources, including solar and wind, they can help reduce dependence on imported oil and increase energy reliability. This can be especially important for countries that are heavily dependent on oil imports.

The electric motor generates very little noise and vibration when running. As a result, the cabin experience while driving is completely different from that of an internal combustion engine, which produces thousands of controlled explosions per minute and thus provides a peaceful driving experience. Electric vehicles can be charged at home, eliminating the need to go to gas stations and thus saving time and money. Electric vehicles have fewer moving parts and require less maintenance than gasoline-powered vehicles, helping to reduce long-term costs. Electric vehicles emit far fewer greenhouse gases than traditional vehicles, helping to reduce air pollution and combat climate change.

The growth of the electric vehicle market is also likely to create new jobs and stimulate economic growth. As more and more electric vehicles are manufactured and sold, the need for workers in the production, installation and maintenance of electric vehicle parts and charging infrastructure is also increasing. This can help stimulate economic growth and create new job opportunities.

Finally, electric vehicles are also important because they drive innovation in the auto industry. The development of EV technology contributes to the development of new technologies, such as better batteries, more efficient motors and advanced charging infrastructure. These advancements could also have a positive impact on other sectors, such as renewable energy and smart grid technology.

D. Evolution of EVs changing the Global Transportation -

1) Global Impact

Globally, electric vehicles are growing at a dizzying pace with a compound annual growth rate (CAGR) of 21.7% by 2030, expected to grow from 8.1 million units to 39.21. million pcs. Massive growth is influenced by a number of factors such as efficiency, pollution and environmental concerns.

Company name	Founded year	Headquarters
Tesla	2003	California
BYD AUTO	2003	Guangdong
Lucid motors	2007	California
Polestar	2017	Sweden
Rivian Automotive	2009	Michigan
NIO	2014	Shanghai

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2) India

The launch of several indigenous electric vehicle models has also contributed to the growth of the electric vehicle industry in India. In recent years, several Indian companies have launched their own electric vehicle models, including Mahindra e2o, Tata Tigor EV, Hyundai Kona Electric, TVS IQube, Ola, Ather, and more. These models have gained recognition in the market, leading to an increase in EV certification. The development of charging infrastructure also played a role in the emergence of electric vehicles in India. With a number of public and private actors, the government has worked hard to develop a nationwide charging infrastructure that enters the market. The transition to electric vehicles is also driven by a growing awareness of the economic and environmental benefits of electric vehicles. With growing concerns about air pollution and global warming, many people and organizations are now choosing electric vehicles as a more sustainable mode of transportation. In addition, the lower operating costs of electric vehicles compared to traditional vehicles have made them an attractive option for businesses and individuals looking to save money on fuel and maintenance costs. The target of the Indian government's EV initiative offers a cumulative investment opportunity of up to Rs 19.7 lakh ($266 billion is a recent increase in government budget allocations and public investment). companies into electric vehicles to achieve this goal.Central and state governments have approved tax incentives for electric vehicles, charging infrastructure and manufacturing that help achieve total cost of ownership success rates with internal combustion engine vehicle (ICE) for multiple segments and other cases of investment in local production and supply chains Electric vehicle startups attract significant venture capital funding driven by product innovation products and their business models, capturing and creating market opportunities offered by electric vehicles.

- *Production Link Incentives (PLI):* Rs 18,100 (US$2.4 billion) Manufacturing Linked Incentive (PLI) scheme approved for investment in Rs 26,058 (3.5 billion) Advanced Chemical Cell (ACC) battery manufacturing USD) approved for auto production with a focus on electric and hydrogen vehicles. electric trailer. The Government of India announced the Deendayal program in June 2014, which will finance and purchase battery-powered trailers in the country.
- *FAME India:* The Ministry of Heavy Industry has been administering the "Fastest Adoption and Production of Electric Vehicles and Hybrid Vehicles in India" program, commonly known as FAME India program since April 1, 2015.

3) Karnataka

The emergence of EV startups in Bangalore also played a role in EV adoption in the city. Companies like Ather Energy and Ola Electric are based in Bangalore and have played a key role in promoting the use of electric vehicles through innovative business models and marketing campaigns. For example, Ather Energy offers an electric scooter with a range of up to 100 km and has established its own network of charging stations across the city. The growing awareness of the environmental and economic benefits of electric vehicles has also contributed to their rise in Bangalore. Many people and organizations are now choosing electric vehicles as a way to reduce their carbon footprint and contribute to a clean environment. The lower operating costs of electric vehicles compared to fuel-powered vehicles have made them an attractive option for businesses and individuals looking to save on fuel and maintenance costs. Therefore, the rise and emergence of trams in Bangalore can be attributed to a combination of many factors including government incentives, available charging infrastructure, emergence of company's electric vehicle startups and growing awareness of the benefits of electric vehicles. As the city continues to battle air pollution and traffic control, electric vehicle use is expected to continue to grow, paving the way for a cleaner, more sustainable future. Bangalore, is known as a tech city with growing awareness of sustainability and environmental issues. As a result, the city has noticed a growing interest in electric vehicles (EVs). The electric vehicle industry in Bangalore is growing rapidly with many startups and established companies investing in research and development of electric vehicles and related technologies.

Company name	Founded year	First round Funding (million US Dollars)
Ola electric	2017	866
Ather energy	2013	286
Bounce	2014	199
Simple energy	2019	33
Mahindra electric	1994	250

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Ultraviolet	2014	37
Yulu bikes	2017	23

II. LITERATURE REVIEW

Axsen and Kurani (2012) conducted a study to understand consumer attitudes towards electric vehicles in North America and found that there is a significant gap between consumers' perception of electric vehicles and willingness to buy them. While the majority of respondents are familiar with electric vehicles, only a small percentage are willing to consider buying one. Consumer attitudes towards electric vehicles vary widely based on demographic factors such as income, education, and age. Specifically, younger, more educated, and higher-income respondents were more likely to consider buying an electric vehicle than older, less educated, and lower-income respondents.

Wang et al. (2019) conducted a series of studies on consumer intentions to use electric vehicles. The review found that perceived benefits, including environmental sustainability and cost savings, were the main drivers of electric vehicle adoption. The study also found that concerns about charging infrastructure, concerns about the range and high upfront costs of electric vehicles are significant barriers to adoption. It suggests that promoting the perceived benefits of electric vehicles, especially environmental sustainability and cost savings, can be effective in increasing consumer acceptance.

Electric vehicles are more likely to adopt them, and the perceived benefits of owning an electric vehicle are a key driver of adoption. Research also shows that charging infrastructure concerns and scope concerns are significant barriers to adoption (Gao et al., 2020). Manufacturers and policymakers need to focus on increasing consumer awareness and knowledge about electric vehicles to increase usage. The results suggest that promoting the perceived benefits of electric vehicles, such as environmental sustainability and cost savings, can also be effective in increasing consumer acceptance. Asian consumers have a relatively high level of awareness and interest in electric vehicles, with more than 90% of them having heard of EVs and over 60% expressing an interest in purchasing one. There are several key factors influencing Asian consumers' intention to use electric vehicles. These include the perceived environmental benefits of electric vehicles, as well as concerns about air pollution and the negative impact of traditional gasoline-powered vehicles on the environment. Other factors that influence consumer intent include cost savings and the ability to improve the driving experience. Zhang et al. (2020) conducted a study on the Asian market and highlighted the potential of Asian consumers to use electric vehicles, especially in light of growing concerns about air and environmental pollution. Molin et al. (2021) investigated the role of social influence in shaping consumers' intention to use electric vehicles. Research shows that social influence, including peer pressure and social norms, is an important factor in electric vehicle adoption. Additionally, research shows that perceived benefits, such as environmental sustainability and cost savings, are important drivers of adoption. Efforts to increase consumer use of electric vehicles should focus on promoting the perceived benefits of owning an electric vehicle, as well as the social influence to encourage use. Van der Veen et al. (2018) studied the relationship between charging infrastructure and the use of electric vehicles in the Netherlands. Research shows that the availability of charging infrastructure is a key factor in electric vehicle adoption, especially in urban areas. The study also found that government incentives, consumer perception of electric vehicles and perceived benefits of owning an electric vehicle were important factors driving adoption. Efforts to increase electric vehicle use should focus on developing a comprehensive network of charging infrastructure that is widely accessible and convenient for consumers. Charging infrastructure plays an important role in promoting the use of electric vehicles, especially in urban areas where electric vehicle ownership may be more feasible due to shorter journeys and accessibility. More convenient access to charging infrastructure. In addition, government incentives and consumer awareness of electric vehicles in promoting use, such as tax credits or subsidies, can help offset the vehicle's higher initial cost. electricity and make them more affordable for consumers.

A. Research Imperative

Researchers thoroughly studied the literature and it has been understood that EV is an emerging market yet there are certain bottlenecks in the industry and the practitioners need to keenly observe the antecedents of customer inclination towards EVs. Hence, the researchers aim to observe on the imperatives on:

1) Factors that influence consumer attitudes and intentions towards EV adoption, including perceived benefits, concerns, and demographic factors.
2) The role of social influence, charging infrastructure, and governmental incentives in promoting the adoption of electric vehicles.
3) The impact of consumer knowledge and awareness of electric vehicles on their intention to adopt them.

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4) The effectiveness of promoting the perceived benefits of electric vehicle ownership, such as environmental sustainability and cost savings, in increasing adoption rates.

III. RESEARCH METHODOLOGY

A. Research Method

This study was conducted using primary data collected from 123 people from different demographic backgrounds, the majority of them aged 20-25. The purpose of the study is to better understand people's interest and awareness about electric vehicles.
The study aimed to investigate the attitudes and perceptions of young people in Bangalore towards trams for their daily commute. The study used a questionnaire consisting of questions using the Likert scale to measure respondents' attitudes and perceptions towards electric vehicles. The subjects of interest of this study are the residents of Bangalore who already use or want to use electric vehicles for their daily trips. The study focuses on this population and ensures that the study results are relevant and applicable to the target population.

B. Sampling

The study used snowball sampling to sample the population. Snowball sampling is a useful data collection method when access to potential participants is limited. It involved existing participants forwarding the questionnaire to their network of contacts. This method ensures that participants willing to participate in the study are connected to the existing sample. Snowball sampling also makes it possible to include hard-to-reach participants, which is difficult to achieve with other sampling methods.

C. Study Design

The data collection method used in the study was an online questionnaire. The questionnaire was submitted online and included questions using the Likert scale to measure respondents' attitudes and perceptions towards trams. Online questionnaires are an effective data collection method because they allow large amounts of data to be collected in a short time. Additionally, the online questionnaire eliminates the need for manual data entry, reducing the risk of human error. A pilot study was conducted before the main study to understand the electric vehicle market. The pilot study provided valuable information on market trends and customer preferences, helping to formulate relevant questions for the primary research. Pilot studies also help identify potential problems and make necessary adjustments before the main study. Cronbach Alpha tested at 0.93, validating the questionnaire for further study so it was sent to 150 people in a circle to collect and within 6 months a total of 123 valid answers were given, created and present.

D. Data Analysis Tools

The data collected from the respondents were analysed using descriptive and quantitative statistics. Descriptive statistics were used to summarize the data and provide an overview of the respondents' attitudes and perceptions towards electric vehicles. Quantitative statistics were used to measure the degree of agreement or disagreement with the statements presented in the Likert scale questions. The use of both descriptive and quantitative statistics allowed for a comprehensive analysis of the data, providing valuable insights into the research problem.

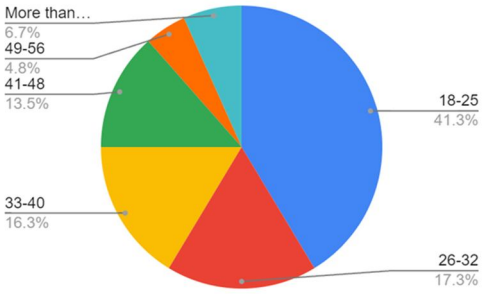
IV. DATA ANALYSIS AND INTERPRETATION

A. Demography of EV Perception in Bengaluru

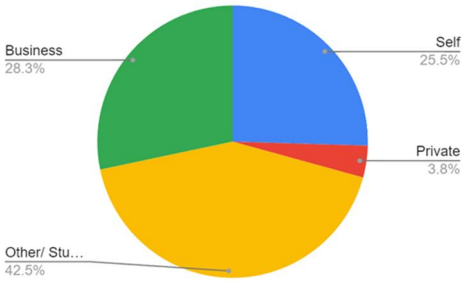
An overview on the utilization and acknowledgment of electric vehicles (EVs) in Bengaluru would uncover significant bits of knowledge for a task pointed toward advancing the reception of EVs in the city. The study would have to cover different angles, for example, the accessibility of EV charging foundation, the reach uneasiness of expected purchasers, the degree of mindfulness and information about EVs, the expense of proprietorship, and the apparent natural advantages. Furthermore, the overview ought to likewise accumulate information on the ongoing utilization examples of customary vehicles in Bengaluru to grasp the possible market for EVs. In view of the review results, the venture can foster designated systems to expand the reception of EVs in Bengaluru.

1) *Electric Vehicle:* A youngsters' Go-To Choose: The majority of the population consists of youngsters ranging from 18-25 (41.3%). As the focus was on the upcoming generation, lesser samples were collected from the older age group. The study found that the primary group of people interested in electric vehicles were younger individuals who were more cost-sensitive when it came to transportation. Furthermore, the market for electric vehicles was found to be growing at a rapid pace as more individuals were willing to adopt the new technology. This can be attributed to the cost benefits associated with electric vehicles, as well as the positive perception of the technology's future prospects.

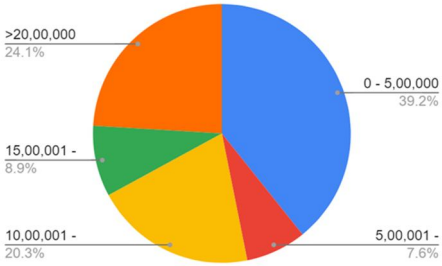
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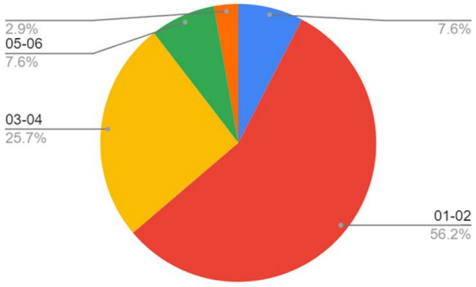
2) *Preferential Segmentation:* The main targeted audience for EV appeared to be students, thus not many from service class are still inclined in purchase of vehicles which could be due the comfort choice for them whereas the students are more experimenting with the latest innovation. 42.5% and the rest consist of the Business, employee, self-employed and unemployed.



3) *All Class Vehicle:* The majority (39%) of the household income was between 0- 5,00,000, followed by the incomes more than 10,00,000 and 20,00,000 hence it can easily be understood that the affordability of EV is not a major challenge in acceptance of this new mode of transportation.



4) *No. of Vehicles Owned:* To target the major consumer, the most important part of the survey was to find the vehicles owned by a family, which gave a result of majority of middle-class households with 56.2% of the surveyed questionnaire to have around 1-2 vehicles and rest 3-4 vehicles of 25% and rest more than 5 with 2.9%,7.6%,7.6% respectively. Having at least one EV in a household along with a petrol car can provide several benefits, including environmental, cost savings, convenience, and potential government incentives



The study also found a positive perception towards the development of infrastructure related to electric vehicles, with respondents indicating that more charging stations and other related infrastructure would increase the appeal of electric vehicles. Additionally, respondents were found to be particularly interested in the low environmental impact of electric vehicles, as well as their speed and fast-charging capabilities and reliability.

The study describes that the market for electric vehicles is growing rapidly, particularly among younger individuals who are cost-sensitive and environmentally conscious. As such, the development of infrastructure related to electric vehicles is likely to further increase the appeal of these vehicles and drive their adoption even further. Overall, the study highlights the need for continued research and development in the electric vehicle space, as well as the importance of understanding consumer attitudes and preferences in order to drive adoption and maximize the benefits of this emerging technology.

The study conducted a survey among a sample of younger individuals who use or are interested in using electric vehicles for their daily commute. The study utilized the snowball sampling technique, which involved existing participants referring the questionnaire to their network of contacts. The questionnaire was dispersed online and featured questions using the Likert scale to measure respondents' attitudes and perceptions towards electric vehicles.

The results of the study showed that the majority of respondents preferred electric vehicles with faster charging speeds and longer ranges. They were also likely to consider purchasing electric vehicles that were fuel-efficient and had better acceleration. Moreover, they expressed a willingness to recommend electric vehicles to their friends and family members.

The study's findings shed light on the attitudes and preferences of younger individuals towards electric vehicles, highlighting the need for continued research and development in this area. The results indicate that the adoption of electric vehicles can be maximized by developing vehicles that meet consumer preferences, such as faster charging speeds and longer ranges.

The study found a significant relationship between the factors at a correlation coefficient value of more than .550 which is as follows –

Significant Antecedents of EVs in terms of Customer Perceptions and Buying Behaviour	Mean
Futuristic Inclination in buying an electric vehicle	3.05
Significance of acceleration for purchasing an electric vehicle.	3.09
Intent to have the developed & advanced infrastructure for charging stations on the public transportation areas	2.72
Intent to have lower environmental impact with reference to the traditional automobile industry.	3.19
Intent to replace an ICEV (Internal Combustion Engine Vehicle) in order to lower carbon footprint in the environment	2.96
Intent to prefer for cost savings attributes associated with driving any of the vehicles (EV & ICEV)	3.05
Intent to prefer the reliability of electric vehicles compared to traditional ICEV for buying decision	3.04
Intent to have the developed & advanced infrastructure for charging stations in the residential areas	3.03

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V. FINDINGS & DISCUSSIONS

The rise of electric vehicles (EVs) as a promising opportunity for gasoline-powered vehicles has led to widespread recognition of the improved infrastructure associated with EVs.

This infrastructure improvement includes charging stations, recycling centres and battery production for electric vehicle parts. The future of electric vehicles is bright as the auto industry turns to electrification to reduce greenhouse gas emissions and sell a sustainable destiny.

Moreover, electric vehicles are very sensitive to the environment, as they produce no emissions, reduce air pollutants and improve the pleasant lifestyle of people in urban areas. The residential EV environment is also an important factor, as it can affect the use and popularity of EVs among the general public. In this essay, we are able to explore the high-quality correlation between EV-related infrastructure improvement, EV fate likelihood, environmental sensitivity, and EV residential environment. Electric vehicles (EVs) have gained popularity in recent years due to their ability to reduce emissions and provide a more sustainable form of transportation. The study showed a positive relationship between vehicle speed, short charging times, low environmental impact and reliability of electric vehicles, underscoring the importance of these factors in the use of electric vehicles.

1) *Infra Development Related to e-Vehicles:* The development of infrastructure related to electric vehicles is an important aspect of the transition to electrification. The most important infrastructure for electric vehicles is the charging station. The charging station provides a convenient and accessible way to charge your vehicle's battery. Governments and private companies are investing heavily in the development of charging infrastructure with the aim of providing a seamless charging experience for electric vehicle owners. In addition, battery recycling is another critical infrastructure needed for the future of electric vehicles. Recycling batteries reduces the environmental impact of electric vehicles and makes them a more sustainable transportation option.
2) *Environmental Sensitivity:* Bangalore, is known as a tech city with growing awareness of sustainability and environmental issues. As a result, the city has noticed a growing interest in electric vehicles (EVs). The electric vehicle industry in Bangalore is growing rapidly with many startups and established companies investing in research and development of electric vehicles and related technologies. Electric vehicles are environmentally friendly, do not emit emissions, reduce air pollution and improve the quality of life for city residents. On the other hand, exhaust gas-powered vehicles emit harmful pollutants such as nitrogen oxides, carbon monoxide and small particles, which have been linked to adverse health effects such as respiratory problems and disease. heart. The introduction of electric vehicles can significantly reduce these emissions, improve air quality and reduce the environmental impact of transportation. Overall, electric vehicles offer many advantages in terms of durability and savings, but limitations in range, charging infrastructure, and upfront costs may make it harder for some consumers to access.
3) *Residential Environment of E- Vehicles:* The habitat of electric vehicles is an important factor affecting the spread and adoption of electric vehicles. In urban areas, the availability of convenient charging and parking infrastructure will facilitate the use of electric vehicles. In addition, the development of EV-friendly communities, such as areas with designated EV charging stations and parking lots, can promote overall adoption of EVs. Living conditions can also affect perception of electric vehicles, with positive experiences leading to better acceptance.
4) *Vehicle Speed:* Vehicle speed is an important factor for drivers, especially those who often travel long distances. Research shows that vehicle speed is positively correlated with electric vehicle use. One of the reasons is that electric cars are known for their excellent acceleration, providing a smooth driving experience. In addition, electric cars have a lower centre of gravity, which improves stability and handling. In addition, the lack of gears and torque of the electric motor allows electric vehicles to accelerate faster than traditional vehicles.
5) *Faster Battery Charging:* Another factor that is positively correlated with electric vehicle use is the short charging time. Research shows that people are more likely to use electric vehicles if they have access to fast charging infrastructure. The availability of fast charging infrastructure is essential for drivers who travel long distances or who have busy schedules. Fast charging infrastructure reduces range worries, a major barrier to electric car adoption. In addition, the fast-charging infrastructure allows the vehicle to be quickly charged during breaks, making it more convenient for the driver.
6) *Low Environmental Impact:* Research shows that people are more likely to use electric cars due to their lower environmental impact. Electric vehicles emit fewer greenhouse gases than conventional vehicles and can help reduce air pollution, which contributes significantly to global warming. In addition, electric cars can run on renewable energy such as wind or solar power, further reducing their impact on the environment. As more people become aware of the importance of reducing carbon emissions, the use of electric vehicles is expected to increase.

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7) *Reliability of Electric Vehicles:* Finally, research shows that people are more likely to use electric vehicles if they are reliable. Reliability is an important factor in any vehicle, and electric cars are no exception. The reliability of electric vehicles is linked to their battery technology. As battery technology advances, the range and lifespan of electric vehicles increase. Additionally, the durability of batteries is essential to their long-term reliability. Research shows that people are more likely to use an electric vehicle if they are confident that the battery will last a reasonable time without needing to be replaced. In addition, people are more likely to use electric vehicles if they have access to reliable maintenance and repair services.

VI. CONCLUSIONS

In summary, there is a positive correlation between electric vehicle infrastructure development, electric vehicle future prospects, environmental performance and electric vehicle living environment. Expanding infrastructure such as charging stations and battery recycling is essential for the transition to electrification. The future is bright for electric vehicles as governments and automakers invest heavily in research and development to improve performance and affordability. Electric vehicles are environmentally friendly, emit zero emissions and improve air quality. Developing an electric vehicle-friendly community is important, as the environment in which electric vehicles live can affect public use and acceptance of electric vehicles. Overall, the positive correlation between these factors shows the huge potential of electric vehicles as a sustainable transportation option in the future. The positive correlation observed in the study between vehicle speed, short charging times, low environmental impact and reliability of electric vehicles highlights the importance of these factors in vehicle use. electricity. Research results show that people are more likely to use electric vehicles if they offer a smooth driving experience, are easy to charge, have less environmental impact and are reliable. These factors are critical to the widespread adoption of electric vehicles and should be considered by policymakers and industry leaders when promoting electric vehicle use. To increase the use of electric vehicles, policymakers should encourage the development of fast-charging infrastructure, encourage the purchase of electric vehicles, and invest in research and development to improve battery technology. Additionally, industry leaders are expected to focus on developing electric vehicles that can rival conventional vehicles in speed and reliability. Ultimately, stakeholders need to work together to spread awareness of the benefits of electric cars and encourage more people to use them. In short, the positive correlation found in the study between vehicle speed, short charging time, low environmental impact and reliability of electric vehicles suggests that these factors are critical for the mass adoption of electric vehicles. The results of the study should be useful.

In conclusion, the study underscores the importance of understanding consumer attitudes and preferences to drive the adoption of emerging technologies such as electric vehicles. By doing so, policymakers and industry players can ensure that they are developing and deploying technology that meets the needs and wants of their target audience. Ultimately, this will lead to the widespread adoption of electric vehicles and the realization of their full potential in terms of reducing emissions and improving air quality.

RECOMMENDATIONS

1) *Disposal of E – waste:* The disposal of EV batteries can have environmental consequences if not properly handled. As EVs are becoming more affordable and widespread, their adoption is still hindered by higher upfront costs, limited range, and a lack of charging infrastructure in some areas.
2) *Policy:* The study highlights the need for policymakers and manufacturers to address these barriers to increase consumer adoption of EVs. The findings also suggest that promoting the perceived benefits of EVs, particularly environmental sustainability and cost savings, may be effective in increasing consumer adoption.
3) *Practice Eco-Friendly Driving:* Eco-friendly driving techniques can help maximise the range and efficiency of EVs, leading to lower energy use and emissions. These techniques include avoiding heavy braking and rapid acceleration, keeping tyres properly inflated, and cutting down on unnecessary idling.
4) *Support Infrastructure Development:* To promote more EV adoption and maximise their environmental advantages, it is essential to support the development of EV charging infrastructure. Making EV charging simpler and more accessible by pushing for the construction of additional charging stations in both public and residential areas can encourage more people to switch to EVs and lessen their environmental effect.
5) *Educate Others:* Raise awareness of the significance of adopting sustainable transportation practices as well as the environmental advantages of EVs. Inform others—friends, family, and the larger community—about the advantages that electric vehicles (EVs) have for the environment and how they may help.
6) *Investigate Resale Value:* Look into the resale value of the electric vehicle model you're considering. Depending on elements like brand reputation, market demand, and general reliability, some EVs may have better resale value than others.

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7) *Total cost of Ownership Analysis:* Although the initial investment in an EV may be more expensive than that of a conventional car, the overall cost of ownership over the course of the car's life may be different because of things like lower gasoline prices, fewer maintenance requirements, and potential incentives. You can better comprehend the long-term financial effects of owning an EV by conducting research on the total cost of ownership, which includes elements like purchase price, depreciation, fuel costs, maintenance costs, and incentives.
8) *Evaluating Available Options:* There are many EV models on the market with a range of features, capacities, and costs. You can compare several EV models, their features, costs, and user reviews by conducting research. This might assist you in choosing the ideal EV for your needs, preferences, and financial situation.

VII. LIMITATIONS

Like several other studies this study also had limitations on several grounds while the research was going around. On the demographic front we can say that the received responses had an imbalanced difference in their numbers. As with any research study, there are potential limitations that researchers must acknowledge when conducting research on electric vehicles. Some common limitations in the study of electric vehicles could include:

1) *Sample Size:* The sample size in this study was small, which may limit our ability to generalize our findings to a larger group of electric vehicle users. The small sample size also reduces the statistical power of the study, making it difficult to detect significant effects or associations.
2) *Selection Bias:* There may be selection bias in participant recruitment or data collection, resulting in a sample that is biased and not accurately representative of the broader group of electric vehicle users. For example, this study only included participants from specific geographic or demographic areas, and the results cannot be extrapolated to other populations.
3) *Data Quality:* The accuracy and reliability of the data collected in this study may be limited. Data can be self-reported by participants, which can lead to biases and errors. Furthermore, data collection methods such as surveys and interviews are dependent on participants' memory, which can lead to memory limitations and it can be subject to bias.
4) *Timeframe:* Electric vehicle technology is evolving rapidly and the results of our research study may only apply to certain timeframes. The landscape of EV technology and adoption may change over time, so results may not generalize to future EV technology or policy changes.
5) *Limited Scope:* Research studies on electric vehicles have focused on certain aspects such as consumer behaviour, environmental impact, and political effectiveness, while other relevant factors have been ignored. This limited scope may not fully capture the complexities of EV adoption and use, and the results may not provide a comprehensive understanding of the topic.

VIII. FUTURE ASPECTS

Adoption of electric vehicles (EVs) is steadily increasing around the world to reduce greenhouse gas emissions, improve air quality, and reduce dependence on fossil fuels. EVs have several advantages, such as lower running costs, lower maintenance requirements, and potential integration with renewable energy sources. However, there are still challenges that need to be addressed to accelerate the adoption of electric vehicles. Future aspects of EVs and research perspectives that may shape future EV development and adoption. The future aspects of electric vehicles (EVs) from a research perspective can be broadly divided into three main areas: Technological advances, Market trends and Environmental impact.

A. *Technological Advances*

Research into EV technology is expected to drive further advances in areas such as battery technology, charging infrastructure and power electronics. Battery technology is an important research area, with a focus on improving battery capacity, energy density, charging speed and durability while reducing costs. Research is also being conducted on developing faster and more efficient charging technologies, such as ultra-fast charging and wireless charging, to address the issues of charging infrastructure availability and charging time. Power electronics, such as motor drives and power converters, are also areas of research to improve the efficiency and performance of electric vehicles.

B. *Market Trends*

Research is conducted to understand and forecast market trends related to electric vehicles. This includes researching consumer preferences, acceptance patterns and market dynamics. Research also focuses on the impact of government policies, regulations, and incentives on EV adoption, and understanding the business models and strategies of automakers, charging infrastructure providers,

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and other stakeholders in the EV ecosystem. I'm here. The market research also examines potential new markets and segments such as electric commercial vehicles, electric public transit, and electric vehicle shared mobility services.

C. *Environmental Impact*

Research is being conducted to understand the environmental impact of electric vehicles over their entire life cycle, including manufacture, use and disposal. This includes evaluating the environmental benefits of electric vehicles in terms of reducing greenhouse gas emissions, improving air quality and conserving natural resources. This research also focuses on assessing the environmental impact of EV battery manufacturing, recycling, and disposal, as well as potential secondary uses for EV batteries. Life cycle assessments and other environmental impact assessment techniques are used in research to understand the overall sustainability of electric vehicles.

D. *Future Outlook for Electric Vehicles*

The future of electric vehicles is bright as the automotive industry moves towards electrification to reduce greenhouse gas emissions and promote a sustainable future. Governments around the world have introduced policies to support the adoption of electric vehicles, including:

B. Tax incentives and rebates for buyers of electric vehicles. Additionally, automakers are investing heavily in research and development to improve the performance and affordability of electric vehicles and make them more attractive to consumers. Continuous innovation in battery technology continues to improve EV range and performance, and EV adoption continues to accelerate.

Electric vehicles have gained significant attention in recent years as a potential solution to mitigate climate change and reduce dependence on fossil fuels. With advancements in technology and growing environmental concerns, EVs are expected to play a major role in the future of transportation. Future research perspectives on electric vehicles can encompass several areas of investigation, including but not limited to:

1) *Battery Technology:* Battery technology is a critical aspect of EVs, and advancements in this area can significantly impact the performance, range, and cost of EVs. Research on improving the energy density, charging time, and durability of batteries can enhance the overall performance of EVs and make them more competitive with conventional vehicles. Additionally, research on new battery chemistries, such as solid-state batteries, lithium-sulphur batteries, and beyond, can offer breakthroughs in energy storage technology that can revolutionize the EV industry.
2) *Charging Infrastructure:* The availability of a robust and widespread charging infrastructure is crucial for the mass adoption of EVs. Research on charging technologies, such as fast charging, wireless charging, and vehicle-to-grid integration, can enhance the convenience and accessibility of EV charging, making it comparable to refuelling conventional vehicles. Moreover, research on optimizing charging station locations, pricing models, and grid integration can help to address the challenges associated with charging infrastructure deployment and utilization.
3) *Policy and Regulations:* Policy and regulations play a significant role in shaping the development and adoption of EVs. Research on policy measures, such as financial incentives, emission regulations, and infrastructure investments, can influence consumer behaviour, market dynamics, and technology advancements in the EV industry. Additionally, research on the impact of policy and regulatory frameworks on different stakeholders, including manufacturers, consumers, utilities, and governments, can provide insights into effective strategies for promoting EV adoption.
4) *Consumer Behaviour:* Understanding consumer behaviour towards EVs is essential for predicting and influencing their adoption. Research on consumer preferences, attitudes, perceptions, and decision-making processes related to EVs can provide insights into the barriers and drivers of EV adoption. Moreover, research on consumer charging behaviour, range anxiety, and user experience can inform the design of EVs and charging infrastructure to better meet consumer needs and preferences.

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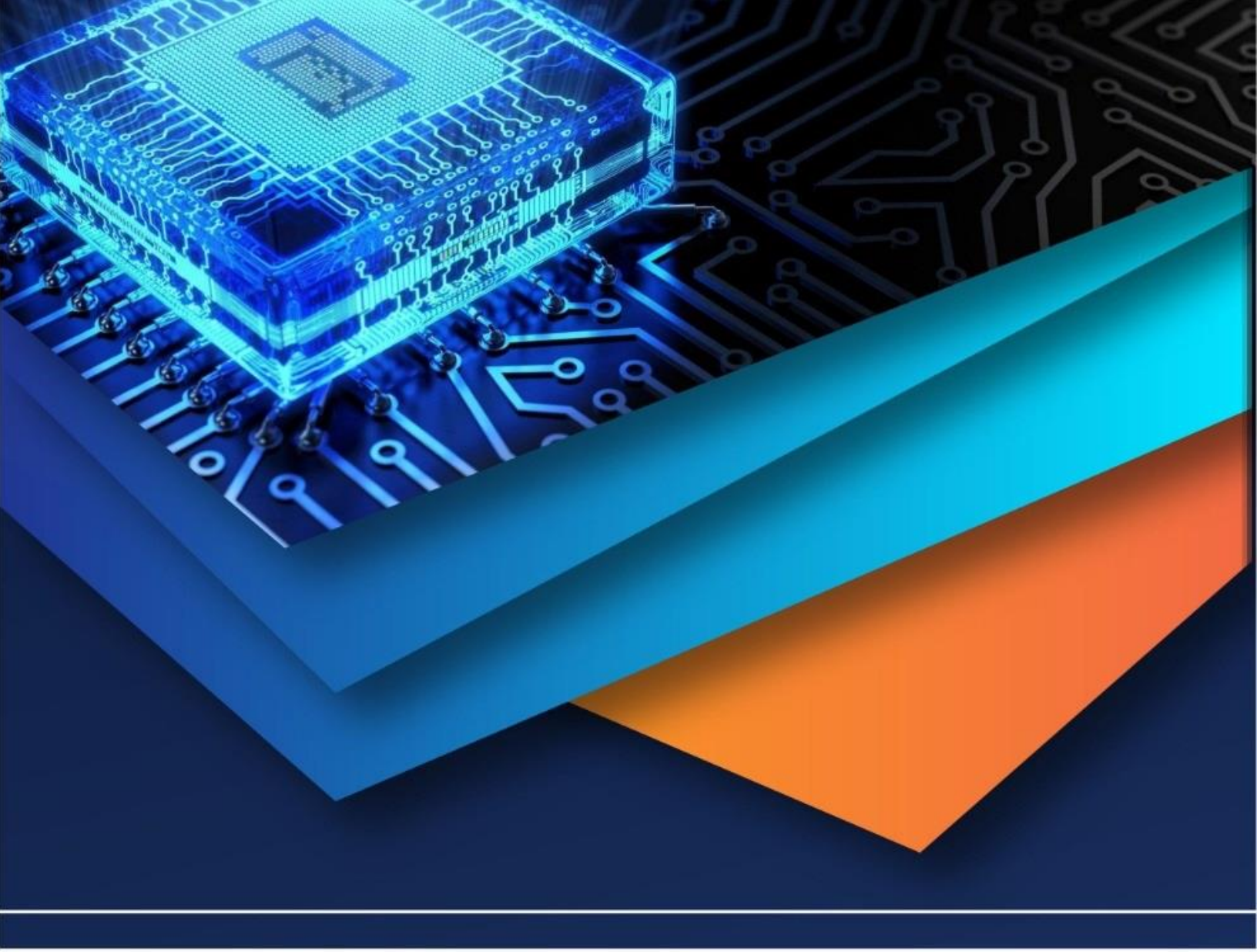
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