Journal of International Commercial Law and Technology
Print ISSN: 1901-8401

Website: https://www.jiclt.com/

Article

Awareness and buying intention of customers towards electric cars

Article History:

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How to cite this article:
N Patnaik, S K Pradhan: Awareness and buying intention of customers towards electric cars, 2026:07 (1): 963-976

Received*: 13-02-2026*
Revised*: 28-02-2026*
Accepted*: 11-03-2026*
Published*: 23-03-2026*

Abstract: Increasing penetration rate of electric vehicles (EVs) is considered among most effective approaches for enabling sustainable transport and mitigating environmental burden. Yet, consumer acceptance continues to be a major problem, particularly in developing countries. This research uses 384 survey responses from a variety of demographics to examine how consumer knowledge and perceived benefits influence electric vehicle attitudes and purchase intentions using the TRA in conjunction with PLS-SEM using SmartPLS. Based on the structural model's findings, being aware of electric cars has a favourable influence on attitude and purchase intention, and perceived advantages have a pretty large positive impact on attitude. One important component of purchasing intent is one's attitude toward electric automobiles, which is discovered to partly mitigate the influence of knowledge on purchasing intent. Taken as a whole, the findings indicate that raising consumer awareness and providing information on the benefits of EVs can improve positive attitudes and purchase intentions. The study offers actionable insights for producers of electric vehicles in particular, but also for policy makers, by addressing the critical issue of how to bridge the information gap and focus efforts on raising awareness as well as credibility in the communication to promote EV adoption.

Keywords: Awareness, Electric Vehicles, Attitude, Perceived Benefits, Buying Intention and Smart PLS

INTRODUCTION

Nearly three quarters of all carbon dioxide emissions come from vehicles travelling on roads, making the transport industry a key polluter. In view of the growing concern regarding the environment polluting aspects of road transport, there has been an increase in adopting clean and energy-efficient, environmentally friendly transport systems that can leave minimum impacts on the environment. In such respect, electric vehicles are considered to be among the promising alternatives to conventional road transport. There are many advantages about EVs as compared to more traditional forms of transportation. To start, EVs are great for the planet - friendly as they are not emitting greenhouse gases during their usage. In addition, electric vehicles provide comfortable usage as they emit little vibration or noise. In this respect, electric vehicles are considered to be alternatives, and therefore, their promotion would provide enormous benefits to the environment or planet Earth (Lashari et al., 2021).

India's automotive sector has contributed significantly to the development of the country's economy, as well as its industrial and employment opportunities. The sector has evolved from a mere automotive domestic market to a prominent automotive manufacturer, driven by escalating investments and technological changes, backed by government policies, making it one of the premier automotive centers across the globe (Access, 2024). Over the years, India's automotive sector has seen many distinct phases of development. In the years leading up to independence, India's automotive industry was severely lacking, with the exception of a small number of imported luxury automobiles. From 1947 to 1980, when India gained its independence, the government placed limits on the admission of international car companies. During this time, Hindustan Motors and Mahindra & Mahindra were the market leaders in the automotive industry. After 1991, the Liberalization Era of India began with economic reforms, leading to the entry of foreign direct

investments. Suzuki and Hyundai, two major global automotive companies, made India an automotive production base. In the Modern Era, ranging from 2000 to the Present, India has established itself as a leading global manufacturer of motor vehicles.

The registration of E-cars in India grew by 70% in 2023, but it still has less than 10% growth. Although E-car prices are falling, they are still more expensive compared to normal cars, and the high purchase price keeps consumers from being able to afford them (Gu et al., 2023). Given that the cost of an E-car is related to its driving range, most consumers would choose based on price. Government policy, like exemptions in tax and reductions in cost, could relieve financial pressures. However, at the stage of policy design, different consumer preferences for incentives should be taken into consideration (Jiang et al., 2020).

Electric cars provide many advantages, including reduced operational costs, energy independence, efficiency, operational smoothness along with quietness, performance, as well as environmental friendliness. The public sector players of the electric vehicle (EV) market cover utilities and government bodies, as well as private sector stakeholders like EV service suppliers and fleets (Pevec et al., 2020). Adopters of EVs with varying types of operational decision-making mechanisms encompass car owners as well as private and public fleet operators. The challenges are Government initiatives, business plans, along with charging infrastructure all work together. Strategies to overcome challenges are the cost, charging points, range anxiety, battery technology, and policy issues need to be addressed for the adoption and integration of EVs in the framework of smart cities (Lai et al., 2022). The strategies could include the development of charging points through public-private sector collaborations, battery technology improvements for cost and extended range issues, and the formulation of public policies to encourage the adoption and integration of EVs through tax relief (Cui et al., 2022). New trends in EV technology, battery swapping, and EV sharing services could also come in handy to reduce costs. The integration of EVs in the framework of smart cities through intelligent transportation systems and renewable energy is also important (Alanazi, 2023). The electric vehicle is recognized because of its benefits in reducing fossil fuel use, it is being considered as a substitute for conventional internal combustion cars. Despite the fact that EVs have the potential to improve transportation in terms of carbon dioxide reduction in transportation and power plants, issues persist that affect electric vehicles on a larger scale. One major problem is that electric vehicles have no or limited range. As a result, battery exchange stations can be delayed if an electric vehicle has not been fully charged before reaching the exchange, highlighting the need to consider battery availability for an electric vehicle in transit.

Consumer Perception is the process of gathering information related to a product and evaluating it to form an informed opinion. A consumer forms his perception of a product on the basis of what he sees. He forms his perception on the basis of advertisements, promotion, customers' feedback, social media comments, and so forth. A consumer's perception of a product develops when he sees or hears something related to that product. This process goes on until his perception of the product begins to take shape. The perception of customers towards a company is defined by the way the company behaves. The layout of products, the shapes and colors of your company, your advertisements, and offers all of these factors make an impact on the way a consumer perceives you (Article et al., 2024). People who see electric cars in action are more inclined to think favourably of them and include them in their future buying plans. A consumer's desire, price, and level of formality to buy an electric car are all positively connected with their level of knowledge about such vehicles. On the other hand, only 21% say they know "fair amount" about EVs, while even fewer say they know "great deal" Customers' views on electric cars have undergone a dramatic shift in India, resulting from both negative and positive factors. Innovations in electric vehicles have led consumers to develop awareness of their affordability, eco-friendliness, and service quality. Greater promotion of electric vehicles has created a better consumer perception of these vehicles. Furthermore, new environmental policies also add to consumer perception of electric vehicles as reliable means of protecting the environment, although there is still room for doubt about these vehicles, mainly because of insufficient support. This reflects and includes novelty of products in the market (Prineesh & Prejilda, 2025).

Factors that influence to purchase of EVs are electric vehicles are future-oriented, cause lower noise pollution, eco-friendly, offers same comfort as petrol vehicles, lower running costs, takes less time to charge, more efficient to travel, lower maintenance costs, very comfortable and more durable (Bm, 2023).

1. Literature Review

This study aimed at filling this gap with regard to the addition of two components, namely, EC, GT, TPB, with the results of the research based on a survey of 626 consumers regarding the impact of various factors related to consumer behavior on purchasing intentions with electric vehicles (EVPI) pointing to a optimistic association among AT, PBC, EC, GT, and EVPI, and a negative connection among SN and EVPI. The study was valuable for being the first to test the assumption of EC and GT with regard to their predictive impact on EVPI, with the results of the study pointing to the necessity of solving the issue of promoting the application of EV with regard to the further development of the country's position regarding other developing countries (Ikram, 2022).

(Gupta et al., 2024) found out the various factors that affect the usage of electric vehicles, considering factors such as the consequences on the environment, perceived barriers, government policies, opinions, and knowledge. Based on the responses received from 506 participants, this paper established and proposed a model that indicated that knowledge and awareness acted as the mediator and the consumer acted as the moderator. Factors such as consequences on the environment are

important factors to consider, as they act as determining factors in the meaning to use ev, whereas government policies are similarly favorable in considering electric vehicles. Perceived barriers are not important factors to consider in adopting electric vehicles in India, whereas opinions and knowledge are important factors to consider to facilitate the usage of electric vehicles.

(Shurideh et al., 2025) aimed to assess the various factors, both economic and consumer attitudes, moderated by some demographic variables, such as age, income, and education, that affect electric vehicles (EVs) in Jordan. Results were derived from a web-based poll of 288 EV owners/drivers, emphasizing the necessity of using economic variables, consumer attitudes, and educating consumers regarding EVs, in addition to marketing strategies for different consumers. It also showed that older people need more experiential information and financial rewards, while young people, specifically those educated at universities, are interested, although policymakers need to provide flexible financial rewards for people who are less interested.

(Riptiono, 2022) discussed aim of this study was to determine the impact of consumption values, environmental concern, and consumer attitudes on the purchase intentions of electric cars in Central Java Province using a sample size of 220 respondents and SEM-AMOS 24. According to the findings of the study, it is understood the importance of human as well as epistemic values on environmental consciousness is positively impacted; on the other hand, functional value quality is not important. Moreover, environmental concern is significantly important in developing consumer attitudes toward green products; however, it remains insignificant in developing purchase intentions. Consequently, it is understood that consumer attitudes toward green products have a significant influence in developing the purchase intentions of electric cars.

(Shetty et al., 2020)shows that compared to CVs, EVs represent a potentially promising solution for reducing emissions and dependence on fossil fuel. However, customer aversion to new technologies has been one of the looming barriers towards the diffusion of EVs into the market. This paper investigates explores the environmental as well as socio-technical obstacles that prevent people from buying electric vehicles as well as assesses how government policy and personal knowledge affect purchasing choices. Based on a survey of 1,230 people in urban areas of India and Sri Lanka, this study pinpoints perceptions related to economic benefits and functional characteristics as the most significant factors that influence EV purchase behavior, along with overall awareness. The results may be useful in informing EV engineering design and may also assist policymakers in framing appropriate transportation and energy regulations.

(Febransyah, 2021) explored a trend of electric vehicles, focusing particularly on Battery Electric Vehicles, and their usage in Indonesia, even after the development of various other electric vehicles. The research had attempted to forecast predictions about the purchase intentions of consumers, particularly focusing on senior professionals, through a decision model; analytic network process, and had identified various factors such as factoring in the overall interest of the battery electric vehicle producers (42.64%), practicality (24.94%), personal identification with the vehicle (21.87%), and total cost of ownership (9.55%). While the study couldn't account for the actual market population, the results may help electric car companies cater to consumers' demands.

When it comes to EU politics, sustainable transportation is now front and center. A less polluting automobile is at the center of the political agenda's efforts to lower emissions of carbon dioxide and other pollutants. Researchers have chosen to base their investigation on customers' intentions to buy BEVs (battery electric vehicles) on the TPB. In order to be included in the sample, 335 consumers were required to have completed the online survey. The findings showed that the variables used to predict purchase intention in the theory of planned behaviour include attitude ($\beta = 0.67$), subjective norm ($\beta = 0.23$) and perceived behavioural control ($\beta = 0.22$). The uncertainty affects the purchasing intention of the consumers indirectly via the variable of perceived behavioral control; however, it's negative ($b = -0.03$) (Riverso et al., 2023).

(X. Wang et al., 2021) discussed aim of the present study is to explore the adoption of BEVs through the development of a "perception attitude behavior" framework, where the perception of incentive policies and social attributes is examined. The results of the study, through an investigation using a structural equation modeling method of 261 potential consumers, showed that the attitudes of the consumers were revealed as a crucial factor influencing their perception of BEVs. The study revealed that the impact of consumers' perception on policies concerning the distribution of funds and data,and convenience policies were significant factors influencing consumers' attitudes about BEVs. On the other hand, the study revealed that the effect of consumers' social attribute on their attitudes and BEVs is very critical; BEV was revealed to be the most significant factor of BEVs.

NEVs, like EC, are revolutionizing China's automobile sector; however, the rate is affected by subsidy policies and COVID-19. In this study, the research assesses the possibility of car-sharing as a tool to adopt the use of NEVs. Results from 1583 surveys formed the basis of the research, which found that issues including pollution as well as economic as well as safety benefits play a critical role in boosting car-sharing electric vehicles. The study recommended that regional targeting could improve the adoption of policies related to the utilization of NEV, authorities could promote their use by creating parking slots and enlightening people on the importance of utilizing NEVs (Hu et al., 2021).

India, being dependent on carbon-based combustion engines, is suffering from a petroleum bill that constitutes around 20% of its imports. This was a drain for the Indian economy in the form of a balance of payments. Being a developing country, the Indian

economy is shifting its focus to electric vehicles. Several companies, like Tesla, Tata, and Hyundai, have come into this sector. However, the An obstacle to the growth of the electric car market in India is the lack of enough charging sites. The importance of sufficient charging points cannot be ignored; it will definitely boost the electric vehicles sector (Nirmala, 2023).

(Balasubramanian, 2025) aimed to examine the link between customer preferences and the attitudes pertaining to purchasing electric cars, focusing on the role that cost savings play as a mediator. Using the cause and effect research model, the study gathered data using a sample of 481 customers in Tiruchirappalli using a purposive method. A questionnaire formed the method of collecting data, and it consisted of using structural equation analysis to analyze the data gathered. The study found that customer preferences contributed to the attitude by indicating a link to cost savings, hence, automakers and the government ought to emphasize the cost-saving factor for electric cars.

(Smitha, 2025) analyzed the consumers' perception of electric vehicles in Bengaluru and the factors affecting the purchase decision. In this descriptive quantitative research design, 145 respondents were surveyed, and the results showed that reduction of air pollution, government incentives, media exposure, affordability, both style as well as layout boosted the desire to buy EVs. Furthermore, the advancement in technology, such as better battery technology, lower price premiums, and operational cost efficiency, also showed a positive relationship with consumer attitude towards purchasing an electric vehicle.

(Kadam, 2025) aimed to investigate the perceptions of electric vehicles (EVs) among consumers in the Pune district of Maharashtra, particularly with regard to their benefits and limitations. The findings from the organised research for collecting related data showed a steep rise in the awareness of EVs among people, though factors like cost, lack of charging infrastructure, and battery life act as major limiting factors. Factors like higher education, income, and concerns for the environment act as driving forces for the acceptance of EVs.

2.1 Hypothesis development

(Bisnis et al., 2024) investigated the influence of electric vehicle technology on the automotive industry and economy of Indonesia, with specific emphasis on the environmental implications of using electric vehicles as a technology. The research investigated things that influence the spread of the technology through the relationships between consumers and environmental awareness, through the survey responses of 136 consumers. Key findings showed positive Interactions among EV affordability, attention to the environment, comprehension of the environment, environmental outlook, along with environmental purchase intent. The findings could offer strategic implications for the adoption of EV technology into the automotive industry of Indonesia, including the need for manufacturers and the government to introduce EV options and frameworks in matters of energy and taxation laws to influence consumer perceptions.

(Y. Wang & Witlox, 2025) carried out a meta-regression analysis of the factors affecting the adoption of EVs by reviewing 38 published articles between 1990 and 2023. The impact of drivers such as factors influencing the uptake of BEVs, including environmental consciousness, user characteristics, obstacles, and user awareness PHEVs, and HEVs was assessed. Significant influences of these drivers were found, and it is observed that environmental awareness has the strongest effect (β= 0.23) on global EV adoption, while the strongest effect for BEVs was in Europe (β= 0.17). This paper considers the promotion of EVs in high-emission countries and also recommends the use of incentives for facilitating the diffusion of EVs in countries with low diffusion, such as free parking and tax exemption.

- **H1:** 'Customer awareness about electric cars has a significant positive effect on attitude towards electric cars'.

Here, using empirical research and theoretical frameworks including the Theory of Planned Behaviour, Technological Acceptance Model, and Norm Activation Model, we investigate consumer behaviour and market dynamics as they pertain to influencing EV purchase intentions. Perceived behavioural control, monetary incentives, societal norms, environmental concern, and technology preparedness are among the most important variables influencing EV adoption. Environmental concerns and the perception of behavioural control have significant impacts on EV choices, according to the analysis. identification and explication of incentives and costs as key aspects of decision-making. Moreover, it highlighted the moderating effects of technological readiness and social norms. More importantly, research gaps are traced, which insinuate the importance of making priorities related to charging infrastructure, incentives, and societal influences significant for the stakeholders to boost EV adoption. Essentially, this study provided a framework for understanding EV purchase intentions and provides implications for governments and marketers in terms of encouraging a switch toward sustainable transportation (Timilsina, 2025).

(Sharma & Agrawal, 2025) explored the factors that influence the purchase intention of Battery Electric Vehicles in Uttar Pradesh. Based on responses from 251, the study demonstrated that socio-demographic variables of income and education affect consumer attitude. The main incentives for the purchase of BEVs are recognised as financial incentives, perceived affordability savings, and environmental awareness. Product performance and charging availability emerge as critical issues, while incentives by the government and marketing strategies emerge as moderate. High costs and inadequate infrastructure, especially in rural areas, present barriers to adoption. Urban consumers demonstrate greater intent than rural ones because of financial incentives and ecological considerations. Accordingly, this study highlighted the significance of infrastructure development and enabling policies in boosting BEV adoption in India.

- **H2:** Customer awareness about electric cars has a significant positive effect on buying intention towards electric cars.

(Ikram, 2022) addressed the information deficit concerning the impact of environmental concerns (EC) and green trust (GT) on consumers' intentions to purchase electric vehicles (EVs). The study used an ETPB to elaborate on behavioural factors such as SN, AT, PBC, while integrating EC and GT. The study utilised a survey of 626 Turkish customers, applying Cronbach's alpha and CFA to verify data reliability, and subsequently employed SEM to examine the correlations. The results demonstrated a favourable association between AT, PBC, EC, and GT with EVPI, while indicating that SN had a negative impact on EVPI. This groundbreaking study in Turkey provides insights into the electric vehicle sector and suggestions for improving sustainable development methods in developing nations.

(Purwanto et al., 2025) seeks to address the knowledge deficiency concerning the impact of environmental concerns (EC) and green trust (GT) on consumers' intentions to acquire electric vehicles (EVs). Through the use of an ETPB to elaborate on behavioural factors such as SN, AT, and PBC, while integrating EC and GT. The study utilised a survey of 626 Turkish customers, applying Cronbach's alpha and CFA to verify data reliability, subsequently employing SEM to inspect the correlations. The results demonstrated a positive link among AT, PBC, EC, and GT with EVPI, while indicating that SN adversely impacted EVPI. This groundbreaking study in Turkey provides insights into the electric vehicle sector and ideas for improving sustainable development practices in emerging economies.

- **H3:** Attitude towards electric cars has a significant positive effect on buying intention towards electric cars.

(Meidutė-kavaliauskienė, 2024) investigated factors impacting consumer interest in purchasing EVs, an essential component of environmentally friendly transportation. These four factors were taken into consideration: PEB, PPB, PPR, PFR. Structural Equation Modelling, Exploratory Factor Analysis, and Confirmatory Factor Analysis were used in a survey including 398 individuals. Based on the results, it was shown that PEB and PPB positively affected PI, whereas PPR and PFR negatively affected it. Electric vehicle uptake may be aided by lowering PPR and PFR and raising PEB and PPB.

- **H4:** Perceived benefits of electric cars have a significant positive effect on attitude towards electric cars.

(Azila, Noor, Muhammad, Nur, et al., 2025) investigated Malaysian consumers' intentions to select electric cars (EVs) in the context of increasing sustainability concerns, utilising the Value–Attitude–Behaviour model and the Theory of Planned Behaviour. It looked at how factors like pricing, maintenance costs, and infrastructure readiness affected how consumers felt about and planned to buy electric cars. Six out of seven hypotheses were validated in a survey of 252 respondents, showing that consumer attitudes, infrastructure preparedness, and maintenance costs all had a favourable impact on the desire to buy EVs. In addition, price, maintenance expenditures, and infrastructure were all affected by customer attitude preparedness on this desire. The research advanced theoretical understanding and provided practical recommendations for marketers and politicians to improve electric vehicle uptake.

(Jie et al., 2025) presented a comprehensive framework that amalgamates the Theory of Reasoned Action, Theory of Planned Behaviour, and Theory of Value Consumption to examine consumer intentions about the purchase of electric cars (EVs) in Malaysia. Consumers' perceptions and intends to purchase EVs are shaped by symbolic meanings, such as status, environmentalism, innovation, and hedonic symbols. The research indicated that these symbolic meanings positively affect both attitudes and intentions, with consumer attitudes serving as a mediator in this interaction. Furthermore, consumer attitude is suggested to mitigate these dynamics, highlighting psychological elements that influence sustainable consumption behaviour. This approach seeks to furnish marketers and policymakers with insights to improve tactics for boosting electric vehicle uptake and establishes a foundation for future empirical research on sustainable consumer behaviour.

- **H5:** The connection between consumer knowledge as well as desire to purchase electric vehicles is moderated by attitude towards such vehicles.

'Research gap'

Notwithstanding a considerable volume of literature on the adoption of an electric vehicle, there are many gaps. A lot of studies focus on factors relating to attitude, environmental concern, government policies, infrastructure, also customer perceptions depending on TPB and its linked models; however, only a few have directly focused on how awareness among consumers translates into the intention to buy, particularly in the Indian context. While existing studies focus on policy, technology, and economic issues, the role of awareness as one of the key drivers influencing purchase decisions remains shallowly debated. Furthermore, subjective norms, perceived barriers, and infrastructure availability have been reported to be highly variable across regions. Only a few studies have examined awareness, environmental concern, cost perception, and behavioral intention combined in one framework for electric cars. Finally, region-specific evidence that captures recent changes in consumer perceptions with rapidly developing EV markets is limited. This study, therefore, examines how customer buying intention towards electric cars is related to customer awareness.

3 Methodology

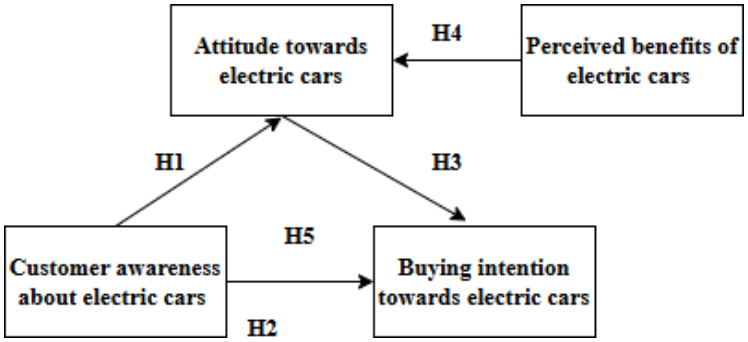
3.1 'Aim of the study'

The purpose of this study is to use SmartPLS 4's Partial Least Squares Structural Equation Modelling (PLS-SEM) to investigate the relationship between consumers' knowledge about electric vehicles and their attitude toward them, as well as their desire to purchase one.

3.2 Research design

The researchers will conduct their study through quantitative explanatory research design which examines how awareness and attitude toward electric cars drive people to adopt electric vehicles. The researchers will acquire primary consumer data through their cross-sectional survey method which uses a five-point Likert scale questionnaire. The study will use non-probability convenience sampling to select participants who will take part in the research. The researchers will analyze collected data using Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis through SmartPLS 4 software which enables them to perform PLS model evaluation and test their proposed hypotheses while studying how attitude serves as a mediator between awareness and electrical cars' intention. The researchers decided to treat all constructs as reflective constructs which permits them to use demographic data in their model analysis.

‘3.3 Conceptual frame work’



3.4 ‘Objectives’

- To assess the effect of electric vehicle awareness on customers’ attitude towards electric cars.
- To assess the direct effect of electric vehicle awareness on customers’ buying intention towards electric cars.
- To evaluate the effect of customers’ attitude towards electric cars on buying intention.
- To examine the influence of perceived benefits of electric cars on customers’ attitude towards electric cars.
- To test the mediating role of attitude in the relationship between awareness and buying intention.

3.5 Hypothesis

- **H1:** Customer awareness about electric cars has a significant positive effect on attitude towards electric cars.
- **H2:** Customer awareness about electric cars has a significant positive effect on buying intention towards electric cars.
- **H3:** Attitude towards electric cars has a significant positive effect on buying intention towards electric cars.
- **H4:** Perceived benefits of electric cars have a significant positive effect on attitude towards electric cars.
- **H5:** Attitude towards electric cars mediates the relationship between customer awareness and buying intention towards electric cars.

‘Sample selection’

The purpose of this research sampling procedure is made up of potential customers or consumers, who are aware of automobiles and also have the potential to buy cars. This study uses 384 sample for analysis. This research makes use of convenience sampling, a non-probability sampling approach, because of the ease of accessibility of this sampling technique, as the researcher can cover all the aspects of different age groups, income levels, education, and residential locations. This study used the Instructions and Response scale and it includes the variables Electric Vehicle Awareness (EVA), Perceived Benefits (PB), Attitude Toward Electric Cars (ATT) and Buying Intention (BI) as variables.

‘Data collection’

The research needs to collect primary data through its structured questionnaire approach. The research instrument measures customer awareness and perceived benefits and electric vehicle attitude and purchasing intention. The questionnaire responses use a five-point Likert scale which measures the range from strong disagreement to strong agreement. The research employs an online-offline survey method which gathers data at one specific moment to create cross-sectional data. The study requires participants to give their answers freely while researchers will use their answers exclusively for academic research. The responses are coded numerically and prepared for analysis by using SmartPLS 4 software.

3.8 ‘Measures ‘

A systematic questionnaire was used to collect the data. Our survey asks participants to rate their level of agreement on a variety of issues related to the research using a Likert-type scale. We have developed well-considered questions to get pertinent data on the topics underway. Each of the five categories of survey takers has its own unique questionnaire.

Table 1 Measures

S.no	Constructs	Number of statements
1	Electric Vehicle Awareness (EVA)	5
2	Perceived Benefits (PB)	5
3	Attitude Toward Electric Cars (ATT)	5
4	Buying Intention (BI)	5

- **Electric Vehicle Awareness:** EVA has been defined as the degree of knowledge of electric cars' availability, attributes, benefits, and government incentives as well as other related market information. In simple words, it is a general understanding of people about the electric vehicle technology and its related affairs. It forms perceptions and influences buying behavior. In this research, EVA has been measured in terms of self-reported knowledge as well as exposure to information regarding electric cars (Gupta et al., 2024).
- **Perceived Benefits:** Perceived Benefits (PB) mean customers' perceived benefits of the advantages that are being associated with electric cars in comparison to conventional petrol or diesel cars. These benefits include cost savings, friendliness to the environment, driving experience, and sustainability of electric cars. In this study, perceived benefits measure how consumers perceive the affordability of electric vehicles of greater value and, as such, are likely to influence their attitude (S. Wang et al., 2025).
- **Attitude Toward Electric Cars:** Attitude Toward Electric Cars (ATT) means the overall positive or negative evaluation, emotions, and behavior toward electric cars, and it also "represents whether consumers view electric cars as good, beneficial, and desirable products, which will drive their purchase intentions (Ariyanto et al., 2025).
- **Buying Intention:** Buying Intention (BI) can be defined as, the intention or customers' future propensity to buy an EV as a result of their current views, sentiments, and plans for EV use. It may be stated as an indicator of how far consumers are inclined, or plan, to use an electric car as an alternative to traditional vehicles, which could also include intentions of recommending it to others. Buying intention has been recognized as a major determinant of purchase intention (Management, n.d.).

Results

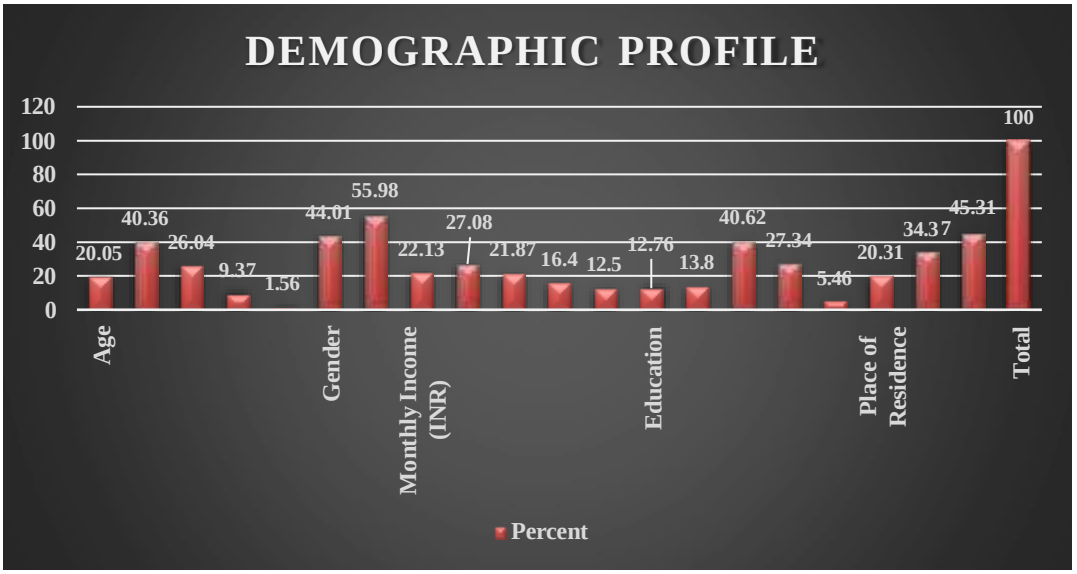
In this chapter, the findings and analysis are presented using SmartPLS (PLS-SEM), which includes electric vehicle awareness, perceived benefits and attitude as separate entities, with the desire to buy serving as the dependent variable. The two-stage study began with checking the measurement model, and then moved on to the structural model to see whether it could withstand the hypotheses and the mediating effects, respectively. The research draws on data from a heterogeneous population, comprising respondents of different genders, ages, levels of education, income brackets, and residential locations, to represent a wider audience of prospective customers for electric vehicles.

4.1 'Demographic profile'

Table 2 'Demographic profile'

Factors		Frequency	%
Age	Below 25 years	77	20.05
	25–34 years	155	40.36
	35–44 years	100	26.04
	45–54 years	36	9.37
	55 years and above	6	1.56
Gender	Male	169	44.01
	Female	215	55.98
Monthly Income (INR)	<25,000	85	22.13
	25,000–50,000	104	27.08
	50,000–75,000	84	21.87
	75,000–1,00,000	63	16.40
	>1,00,000	48	12.5
Education	School	49	12.76
	Diploma	53	13.80

	Undergraduate	156	40.62
	Postgraduate	105	27.34
	PhD/Professional	21	5.46
Place of Residence	Rural	78	20.31
	Semi-urban	132	34.37
	Urban/Metro	174	45.31
Total		384	100



The demographic profile of the participants shows a wide range of ages, genders, income levels, educational attainment levels, and places of residence. The years group of the respondents is predominantly represented by the 25 to 34 years category, followed by the 35 to 44 years group; relatively fewer respondents are represented from the 45 to 54 years and 55 years and above categories. In terms of gender, female respondents outnumber their male counterparts. In terms of salary, a larger group of respondents receives salaries falling within the range of ₹25,000 to ₹50,000 and is followed by respondents receiving salaries below ₹25,000 and ₹50,000 to ₹75,000; relatively fewer respondents receive higher salaries. Nearly all of those who took the survey had completed at least one year of college. followed by postgraduate degree holders. A relatively few group of respondents possess school qualifications, diploma, and doctoral degrees. In terms of residential background, most most people who filled out the survey call metropolitan areas house and metropolitan areas, followed by semi-urban, and relatively a few respondents reside in rural areas.

Measurement CFA Model

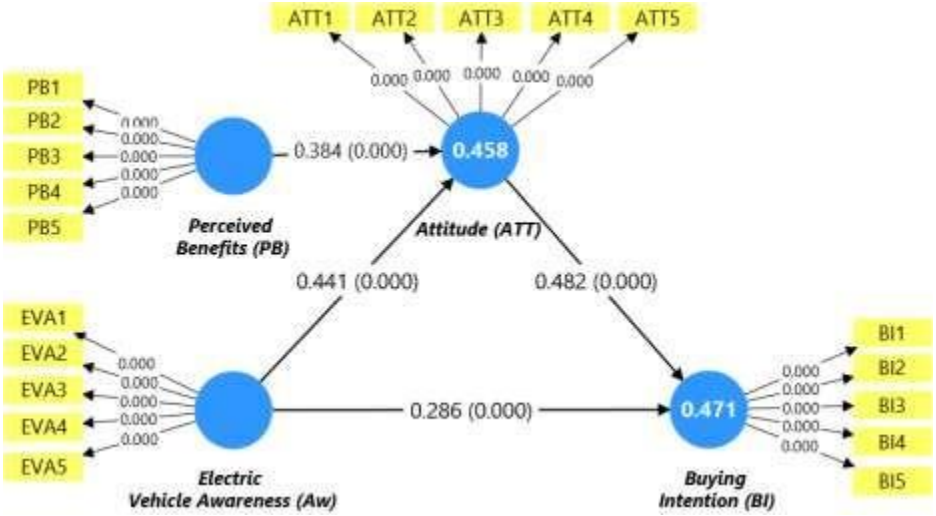


Figure 1 Measurement model

Table-3: 'Process of validity and reliability construct results'

Table 3 Process of validity and reliability construct results

Constructs		Items	Outer loadings	Cronbach's alpha	Composite reliability (CR)	Average variance extracted (AVE)
Attitude	---->	ATT1	0.855	0.882	0.884	0.68
	---->	ATT2	0.816			
	---->	ATT3	0.817			
	---->	ATT4	0.799			
	---->	ATT5	0.837			
Buying Intention	---->	BI1	0.859	0.903	0.904	0.721
	---->	BI2	0.847			
	---->	BI3	0.844			
	---->	BI4	0.841			
	---->	BI5	0.853			
EV Awareness	---->	EVA1	0.845	0.876	0.881	0.669
	---->	EVA2	0.816			
	---->	EVA3	0.789			
	---->	EVA4	0.836			
	---->	EVA5	0.802			
Perceived Benefits	---->	PB1	0.838	0.878	0.879	0.672
	---->	PB2	0.813			
	---->	PB3	0.816			
	---->	PB4	0.815			
	---->	PB5	0.815			

The goal of the measurement model evaluation (commonly CFA in SEM reports) is to assess whether the items on a scale are able to reliably and validly measure the presumed latent construct prior to examining the structural model (specified hypotheses). In particular, this stage assesses: (i) outer loadings as an indicator reliability metric, (ii) CR and Cronbach's alpha for internal consistency reliabilities, and (iii) AVE for convergent validity. Verifying these attributes allows meaningful interpretation of the Attitude, Buying Intention, EV awareness, and Perceived Benefits constructs at a reliable and valid level as well as the results of the structural model.

Table 1 illustrates excellent quality of measurement for all constructs. Firstly, r (item, construct) reliability is supported, as all items have high outer loading (between 0.789 and 0.859), which is above the suggested value of 0.70. Hence each item has much variance in common with its construct and can be considered as a good indicator. Moreover, internal consistency reliability is also confirmed for every construct. Cronbach alpha scores are all above the threshold for acceptable values (Attitude = 0.882, Buying Intention = 0.903, EV Awareness = 0.876, Perceived Benefits = 0.878). Similarly, the above mentioned CR values (0.879-0.904) are also within the recommended range of 0.70-0.95, which greatly indicates the measures are reliable. Third, convergent validity was confirmed as all constructs the AVE values over 0.50 (Attitude=0.68, BI=0.721, EV Awareness=0.669, Perceived Benefits=0.672). This suggests that more than 50% of variances the indicator's linked construct provides an explanation for it, suggesting that the items used for assessment are accurately reflecting their respective latent structures. All things considered, these results show that the measurement model satisfies the requirements for convergent validity, internal consistency dependability, and indicator reliability. suggesting the measurement scale is acceptable and robust to be employed for further structural model and hypothesis testing.

Table-4: 'Correlation matrix and discriminant validity findings'
Table 4 'Correlation matrix and discriminant validity findings'

	Attitude (ATT)	Buying Intention (BI)	Electric Vehicle Awareness (Aw)	Perceived Benefits (PB)
Attitude (ATT)	***0.825***			
Buying Intention (BI)	0.645	***0.849***		
Electric Vehicle Awareness (Aw)	0.572	0.561	***0.818***	
Perceived Benefits (PB)	0.535	0.359	0.343	***0.820***

By include evidence of discriminant validity with the correlation matrix, we want to make sure that all of the latent components in the measurement model are indeed different from each other. This verifies that the ideas of Attitude, Buying Intention, EV Awareness, and Perceived Benefits are not synonymous in SEM. The Fornell-Larcker criteria for this is that the square root of the AVE of each construct (shown diagonally) should be greater than the inter-construct correlations (shown off-diagonal). Using the structural model to test further hypotheses is justified by the protectiveness of discriminant validity. Each construct's square root of AVE is given along the diagonal in Table 2, which shows the relationships across constructs (ATT = 0.825, BI = 0.849, Aw = 0.818, PB = 0.820). Each concept has a diagonal value that is bigger than the sum of all correlations between it and all other constructs, indicating appropriate discriminant validity according to the data. There is a stronger correlation between the Attitude construct and its indicators (0.825) than with Buying Intention (0.645), EV Awareness (0.572), or Perceived Benefits (0.535), suggesting that Attitude shares more variation with its indicators than with other constructs. The same holds true for purchasing intent, which has a higher correlation of 0.849 than its corresponding variables for attitude (0.645), awareness (0.561), and perceived benefits (0.359). Consistent with this finding, EV Awareness (r=0.818) and Perceived Benefits (r=0.820) correlate better with their own items than with items from other constructs.

Hence, the correlation pattern indicates that they are conceptually similar but unique constructs and the Fornell and Larcker (1981) criterion for satisfactory discriminant validity was met for all constructs. Consequently, it can be seen in the Table each construct reflects a distinct aspect of consumer knowledge and purchase intention of the electric car, and the measuring approach offers adequate discriminant validity to support this result.

Table-5 Model fit overview
Table 5 'Model fit overview'

	Saturated model	Estimated model
SRMR	0.047	0.047
d_ULS	0.461	0.461
d_G	0.167	0.167
Chi-square	376.591	376.537
NFI	0.918	0.918

In PLS-SEM, reporting model fit indices helps determine whether the given model is appropriate and how well it reproduces the sample data. Discrepancy indices (d_ULS and d_G) and global fit indices (SRMR and NFI) are often given to show that the measurement and structural model are not severely misspecificated, whereas PLS-SEM is focused on prediction. Finding out if the stated structural linkages substantially enhance the model fit to the data compared to a model where the latent variables are permitted to freely covary may also be done by comparing the saturated and estimated models. The model fits the data well, as seen in Table 3. Both the saturated and parameterised models have an SRMR of 0.047, which is lower than the threshold value of 0.08. This indicates that the model-implied correlation matrix and the observed correlation matrix are well fitted. It follows that the inclusion of the structural routes does not detract from the model fit, as the two models were found to have equivalent SRMR, a measure of fitness. The saturation and model discrepancy measurements, d_ULS (0.461) and d_G (0.167), are identical, indicating that the model has stable discrepancy values. Although these indices are often associated with SmartPLS's bootstrap-based cutoffs, the fact that the two models' values are similar suggests that the model being estimated is adequate.

Hypothesis Implementation

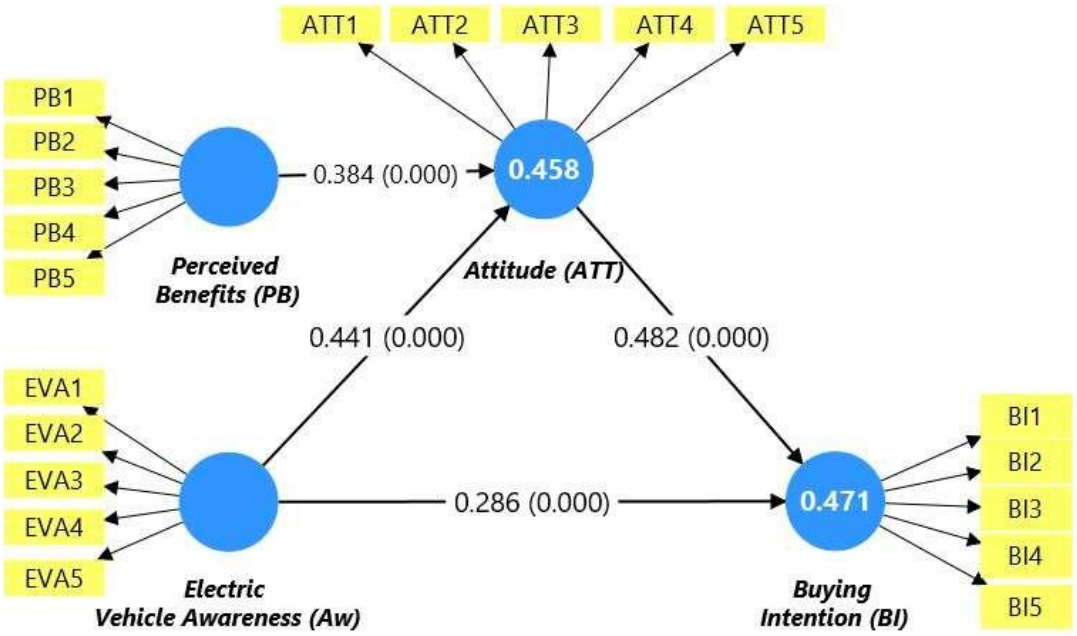


Figure 2 Hypothesis Implementation

Table-6: Direct Effects (H1 – H4)

Table 6 'Direct Effects (H1 – H4)'

Hypothesis	Structural Path	β (Original Sample)	t-value	p-value	Decision
H1	Awareness (Aw) → Attitude (ATT)	0.441	11.961	<0.001	Supported
H2	Awareness (Aw) → Buying Intention (BI)	0.286	5.913	<0.001	Supported
H3	Attitude (ATT) → Buying Intention (BI)	0.482	11.373	<0.001	Supported
H4	Perceived Benefits (PB) → Attitude (ATT)	0.384	10.3	<0.001	Supported

The direct effects for H1–H4 are presented in Table 4, demonstrating that all hypothesised relationships were significant ($p < 0.001$). Last but not least, the results show that electric vehicle attitudes are greatly influenced by consumer knowledge and perceived advantages, with attitude acting as a key precursor to buying intention. The findings support H1, indicating that awareness of electric vehicles positively influences attitudes towards

electric cars (β=0.441, t=11.961). This suggests that enhanced awareness, such as understanding EV features, related incentives, and other relevant information, allows consumers to develop favourable attitudes towards electric vehicles. In essence, individuals with a deep familiarity with EVs are more likely to see them as a practical and appealing choice, rather than perceiving them merely as low-performance, specialised options. Furthermore, H2 receives support, providing strong evidence that knowledge significantly influences purchase intent (β = 0.286, t = 5.913). The findings indicate that awareness influences consumers in both direct and indirect ways, enhancing their willingness to purchase electric cars through shifts in attitude. As knowledge and access to information about electric vehicles improve, consumers are increasingly inclined to consider adopting EVs. Third, H3 is validated and exhibits the highest path coefficient among the direct effects in the model (β = 0.482, t = 11.373). This highlights the significant influence of attitude in the procedure for deciding to buy electric cars. Consumers exposed to favourable information about electric cars tend to exhibit a stronger intention to buy, indicating that positive perceptions and general acceptance are key elements that can drive purchase intentions. Ultimately, H4 received support, demonstrating that perceived benefits positively influence attitude (β = 0.384, t = 10.300). This finding indicates that when consumers perceive electric cars as beneficial (e.g., energy-efficient, eco-friendly, and easy to use), They are more likely to be optimistic toward EVs. Consequently, offering clear and credible benefits could improve consumer acceptance. In conclusion, these findings suggest that enhancing public awareness and emphasising the product and environmental attributes of electric cars may foster more favourable consumer perceptions, potentially boosting purchase intentions encouraging more people to buy electric cars.

Table-7: Mediation Results H5

Table 7 Mediation Results H5

Relationship	Direct Effect (β)	Indirect Effect (β)	Total Effect (β)	t (Indirect)	p (Indirect)	Mediation Type
Aw → ATT→ BI	0.286	0.212	0.498	8.09	<0.001	Partial mediation

The table 4 results of the mediation analysis for H5 show that attitude toward electric cars (ATT) mediates the connection between electric vehicle awareness (Aw) and buying intention (BI). The results show that awareness leads to a buying intention through attitude which creates a positive and statistically significant indirect effect (β = 0.212, t = 8.09, p < 0.001). Consumers who heavily use electric cars possess better electric car knowledge which makes them develop a more favorable view of electric cars. The direct effect of awareness on buying intention remains intact with a value of (β = 286) when attitude is treated as a mediating factor. The total effect of the study shows a strong impact (β = 498) because awareness creates both direct and indirect effects which operate through attitude. The study reveals partial mediation because both direct and indirect effects of the study show statistical significance. The study shows that attitude functions as the primary route through which awareness produces positive effects on buying intention while awareness maintains a direct effect that attitude cannot fully mediate.

Discussion

The present study's findings are in agreement through recent research that has highlighted consumer awareness, attitudes, and perceptions as key factors that impact electric vehicle buying intentions significantly. For instance, in their study on consumer behavior and electric vehicle purchase decisions, (Lashari et al., 2021) clearly show that consumer attitudes and perceptions are critical factors that drive electric vehicle purchase decisions, as evidenced in the results of this study that highlight consumer awareness as a vital purchase intention driver. (Nurgul et al., 2023) also shows that consumer behavior, particularly on electric vehicle purchase decisions, is significantly influenced by perceived convenience, as well as considerations of environment and economics. Similarly, (Azila, Noor, Muhammad, Isa, et al., 2025) also substantiates that consumption values and environmental awareness, which influence consumers, further motivate them towards seeking more sustainable mobility solutions. Moreover, (Gupta et al., 2024) highlights that public awareness requires an understanding of the benefit associated with using an EV, thus helping in overcoming barriers like charging and cost concerns, further ensuring robust adoption intentions. Therefore, From these proofs, it is clear that being knowledgeable is crucial in influencing purchase intentions.

Conclusion

In general, the results support that the objectives of the study in terms of customer awareness and buying intention in relation with electric car was reached. Findings indicate that awareness of EV is a salient precursor in the EV adoption process: it has a positive impact on customers' boldness to EV and has a direct influence on their buying purpose. Moreover,

consumers' perception of benefits (including economic and environmental benefits, as well as convenience) greatly facilitates their attitude, which suggests that benefit judgments play an significant part in consumers' positive evaluation of electric cars. Most notably, the mediation analysis reveals that attitude significantly mediates awareness and buying intention, indicating that awareness fosters a stronger product purchase intention in part by cultivating a positive attitude towards EVs. Nevertheless, as awareness still exerts a sizeable direct effect on buying intention, the mediation is partial, suggesting awareness affects purchase intention not solely via attitude formation, but also via some other direct routes (such as confidence, familiarity, less uncertainty). Overall, the study infers that raising awareness and demonstrating the practical welfares of EC in the eyes of customers may have a substantial impact on enhancing positive attitudes and thereby increase consumer purchasing intentions for electric cars, which contributes toward promoting EV diffusions.

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