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The University Students' Perception on Electric Vehicles and its Impact on their Willingness to Buy

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ABSTRACT:

EVs migration symbolizes the major transformation towards green transport track, interned by an aim to minimize emissions, improve energy efficiency, and minimize environmental damage. This work is focused on the changing trends in the automotive sector, which is caused by the introduction of the stricter emission standards and promotion of the electric mobility by countries worldwide. By having an emphasis on consumers' EVs perceptions, we see factors that affect their adoption decisions including demographics, accessibility, backgrounds, and types of mental disorders. An analysis of the most important research findings in this area provides the consumers and policy-makers with a perspective which will also be valuable to industry players. Respective issues in regard to electric vehicles, including infrastructure, policy, economics, and social impact, are also presented for a complex view on the barriers and opportunities of the electric vehicle market. Through finding the knowledge and perception gaps relating to EVs, this study seeks to make a positive difference towards an EV-powered future.

1. INTRODUCTION

Now the transportation is being undergoing a meaningful transformation, which is triggered by the technological progress, environmental issues and also new consumer behaviour. Being the first proponents for this change are the electric vehicles (EVs), which are considered as a more sustainable alternative to the conventional gasoline vehicles. By virtue of the fact they can curb the emissions, improve energy efficiency, and also decrease the environmental impact, Electric Vehicles (EVs) have managed to capture the imagination of the policymakers, the industry players, and the consumers alike. In this comprehensive analysis, we unveil the complexities of how the consumers view and appraise the electric vehicles. We take a look at the brick-in-the-wall future of the automotive industry, the present status of EV adoption, and also the urgent need for a deeper insight into the consumer attitudes towards electric mobility.

1.1 Future Scenario of the Automotive Industry:

Future Scenario of the Automotive Industry: The automotive industry has seen a lot of changes over the last 50 years. The existence of the automotive industry is very closely associated with the electric vehicle's increasing popularity. With climate change growing as a major concern and tougher rules being deployed, governments across the world are implementing tougher emission standards and promoting a switch to electric mobility which is much incentivized. The new reality is being recognised by the car makers with a surge in investments in electric vehicle design and also manufacturing. As per the industry estimates there would be exponential growth in the demand of EVs and in the future electric vehicles are likely to totally dominate the global automobile market.

Electrification of the transport sector does not only include passenger vehicles but it covers commercial vehicles, public transport and also two-wheelers. Renewable technologies are the key to the electric revolution, which will make an autonomous, interconnected transport system possible, where the vehicles communicate with each other and share information about the battery power, and thus the need for a central control system will be eradicated. The advent of autonomous driving technologies and the increase in the shared mobility schemes make the electric vehicles poised to go beyond the emission reduction but also bring a radical change in the way we commute and move around the urban areas.

In spite of the bullish expectation of electrification in the mobility sector of the future, the present situation of EV adoption is quite variable. Although electric car sales are having an upward trend in some areas, they have a very small share of the whole car market. Rage anxiety, perceived high initial costs upfront and insufficient charging stations still represent major challenges to EV mainstream adoption. Therefore, the level of knowledge and perception of consumers regarding electric vehicles differs from one person to another where beliefs are based rather on misinformation and assumptions than on real benefits of electric cars.

Nevertheless, there are spots of budding in the EV segment. Many governments are pushing out highly ambitious incentives and subsidies to push for EVs ownership, including such measures as tax cuts, rebates, and exemptions from road congestion charges. Electric car manufacturers are launching a range of models, covering various demand segments and lifestyles of consumers. Improvements in battery production are lowering prices and raising the reliability and range of electric cars, which gradually make them more preferable to their internal combustion engine equivalents to the consumers.

Faced by the transforming landscape of the auto industry and increasing presence of electric vehicles in the market, there is a great demand for a broad assessment of consumer attitudes and preferences towards EVs. A comprehensive understanding of the factors that influence consumer adoption decisions such as attitudes, beliefs values and socio-economic factors is critical in strategy formulation for speeding the transition to electric mobility.

This study aims to look into this vital issue of the lack of knowledge about the diverse facets of the consumer perceptions towards electric cars. Through identification of the risk factors and possibilities hindering EV adoption we intend to offer a great amount of information for a large spectrum of stakeholders seeking ways to reach a sustainable transportation. By examining the available research through a systematic analysis of surveys, empirical data and a systematic analysis of existing research, we aim at providing a picture of the condition of factors shaping consumer perceptions of electric vehicles.

2. REVIEW OF LITERATURE

Ivanova and Moreira (2023) carry out a systematic literature review focusing on the consumers' perspective of electric vehicle purchase intention antecedents to advance knowledge regarding consumer behaviours toward EV purchases. Analysing 63 articles published between 1994 and 2021, the study classifies antecedents into three categories: Consumer characteristics, EV characteristics and policies relating to the electric vehicle. To demonstrate the power of each antecedent a summary model is developed which gives significant insights into factors that determine values to purchase EV. The paper provides a description of the descriptive outcomes associated with sample results and makes directions for future developments, together posing recommendations on designing productive strategies and policies facilitating sustainable mobility development.

Bas, Zou and Cirillo (2023) provide an analysis involving machine learning methods on the implications of attitudinal factors alongside ride sourcing aspects towards EV adoption. Detecting the need in awareness of consumers' preferences as a guideline to policy decision for development towards sustainable transport, authors use stated preference survey data for prediction EV take-up. They include attitudinal considerations, ride sourcing behaviours (such as frequency of use for Uber/Lyft), sociodemographic variables and vehicle related factors in their analysis. In order to make interpretability easier, they use Local Interpretable Model-Agnostic Explanations (LIME) method revealing each factor's impact on predicting EV adoption. Their results highlight the important role of ride sourcing frequency, EV knowledge and environmental

consciousness in making individuals willing to accept CEVs which is useful for policymakers and researches involved with sustainable transport.

The problem of future development is highlighted in the article "Where will go for electric vehicles (EVs) China after government subsidy incentives abolished?" by Shi, Wu, [36] and Lin2023.) In which authors discusses about EV adaptations also analyses to find out that what strategies are needed. Acknowledging the criticality of customer WTP for environmental perceived benefits of EVs, the present study fills a gap in literature by exploring consumer attitude and behaviours towards electric vehicles without subsidies. The authors conduct micro-survey with a large sample size that appears to indicate consumers' understanding of EVs having low level of greenness product features and their willing play for environmental attributes conferred by these products are contingent on other factors, e.g., social responsibility awareness The research draws attention to the problem of shifting the subsidies costs from governmental authorities towards consumers and stresses on need for proper regulatory tools which are able not only cut down EVs price, but also make public aware about long-term impact they can bring with forming this environment-friendly ground around.

Rajeev Ranjan Kumar and Kumar Alok (2020) examined the field of study on electric vehicles in their article titled "Electric Vehicle Adoption: A Literature Review and Outlook for Sustainability." This study used a systematic review and examined 239 articles in Scopus Q1 journals. This analysis provides a better understanding of the research domain by breaking down changes into antecedents, mediators, moderators, consequences, and practices. This review covers informal topics such as vendor experience, charging electronics quality and marketing strategies, as well as in-depth topics such as infrastructure costs, total cost of ownership and purchasing support. The aim of the analysis of key practitioners and carers is to assist researchers and policy makers and provide a better understanding of what may be happening. In addition, this study develops an integrated set of homological and compartmentalized policy recommendations that add valuable context to the existing EE literature.

Virender Singh (2020) identified the factors influencing the adoption of electric vehicles (EVs) in his study titled "Analysis and Simple Meta-Analysis of Factors influencing electric vehicle adoption" published in Transportation Research Part D: Transportation and Medium Environment. Based on 211 articles analysed from 2009 to 2019, this study broke down relevant factors into demographics, conditions, backgrounds, and types of mental disorders. Comprehensive overview of theoretical perspectives provides insight into EV behaviour and consumer needs. This study also conducted a simple meta-analysis revealing the main research on factors influencing EV use over the past decade. The findings have implications for management and suggest future directions for EV researchers and practitioners and provide guidance to the government and the automotive industry on increasing the share of EV usage.

Adhikari et al. (2020) conducted a study to identify and analyse the challenges faced by electric vehicles (EVs). This study provides a framework that separates constraints into road, policy, business, infrastructure and social. In order to carry out this ranking process using the hierarchical analysis method, seventeen topics were identified from various sources and expert opinions were collected. The results show that infrastructure, policy, economics, and economics are more influential than social impact in the context of EV adoption in Nepal. Key problems include the lack of charging stations, the high purchase price of electric vehicles and the lack of government planning. Based on basic local principles, the proposed project provides a replicable model for similar studies in other countries.

Kong Deyang (2020) examined that the Impact of Various Policies on the Promotion of Electric Vehicles under China's Emission Reduction Policy: Multiple Perspectives", "Applied Energy", Kong et al. The impact of regulations on the diversification of electric vehicles (EV) in China was investigated. The study focuses on energy reduction, climate change and air pollution and examines the impact of subsidies, carbon emissions trading and licensing restrictions immediately after the procurement assistance scheme is phased out. The study uses a dynamic model that includes the interaction between government, business and consumers, and uses various scenarios for forecasting. If the subsidy is removed, China's electric car industry will fall by 40.39% in 2020. Research shows that the discussed policy can offset the negative impact of removing subsidies and support for the continued development of electric vehicles. But he said law reform should be based on the real situation and obligations should be improved by unifying rules. The results of this study contribute to a nuanced understanding of the complex variables affecting EV diffusion in the context of environmental change.

G. Krishna (2021) conducted a thematic analysis to understand consumer preferences for electric vehicles (EVs) and identify barriers to their mass adoption. Unlike traditional research methods, the study uses thematic analysis to investigate the factors affecting the purchase of electric vehicles, including various indicators. This study highlights the often overlooked role of opinion by using electronic word of mouth (eWOM) and focusing on online sites where people share ideas. This approach provides insight into distinct and unseen aspects of EV products and customer needs. This study also demonstrates the relationship between the issues regarding the potential negative impact on overall adoption.

BE Lebruhi et al. (2021) provides a comprehensive review of the key issues related to the mass growth of electric vehicles (EVs). In this study, the authors demonstrate the important role of the electric vehicle in the context of countries using energy switching policy to achieve carbon targets and decarbonise transport. This study provides an in-depth look at the current bottlenecks and problems related to the widespread use and commercialization of electric vehicles. The analysis covers important topics including the impact of mass EV integration, energy management tools, services provided by EVs, optimal placement and payment size, estimated lithium-ion battery availability, battery features, and strategies aimed at accelerating the adoption of EV Incentives. The results of this review provide valuable insight and recommendations for policy, serving as a resource for policymakers seeking to promote electric vehicles and advance EV technology.

Christopher B. Kaliff et al. (2021) investigated the impact of new technologies on consumer beliefs, focusing on reducing the risk of electric vehicle (EV) use. Their work developed a model based on decision theory (TRA) and the risk-benefit model; this showed that EV purchasing decisions are often influenced by belief in the perceived benefits and risks of technology and social impact. More importantly, the study found that trust in the manufacturer's expertise and reliability plays an important role in reducing consumer concerns and increasing confidence that the product technology can be done. The authors validated the decision-making model for consumers using structural equation modelling of the research data. The results provide a deeper understanding of consumer risk and trust gains when encountering new technologies that represent change. The findings also provide insights for technology companies to improve their marketing strategies to increase demand for technology products.

Asadi et al. (2021) conducted an in-depth study on the impact of Malaysian consumers on their willingness to adopt electric vehicles (EVs). This study demonstrates the contribution of electric vehicles to the stability of the global economy and highlights the need to understand the consumer needs of electric vehicles. Developing a model based on the dynamic model and the theory of planned behaviour, this study collected 177 valid questions from potential consumers in Malaysia. Through empirical analysis using structural equation modelling, the study identified several important and positive factors that influence consumers' willingness to purchase electric vehicles. These factors include value awareness, personality, and acceptance of responsibility, standards, personal style, customer satisfaction and awareness of experiences. These findings help better understand user behaviour of electric vehicles and have the potential to influence the promotion of electric vehicle development.

Sarasuya de Rubens et al. (2020) examines the business model for the growth of electric vehicles (EVs) and recognizes the evolution of the business from niche to mass market. This study, based on semi-structured interviews with 227 experts from 201 universities in five Scandinavian countries, shows the negative economic problems of electric vehicles. The problems arise from the history of the traditional automobile industry, the national economy, and the inappropriate business model and equipment, which affects the production and business of electronic products. This study reveals the need for a new business to adapt to the widespread use of electric vehicles and foresees changes in the sale of vehicles, the form of delivery, the maintenance of incoming money and the samples paid.

Ecer (2021) emphasizes the importance of battery electric vehicles (BEV) in limiting pollution, touching on the rapid transition from fossil fuels to renewable energy sources. This study presents a multidimensional decision-making process (MCDM) to evaluate BEV alternatives. Ten BEVs were evaluated using various MCDM technologies, including SECA, MARCOS, MAIRCA, COCOSO, ARAS, and COPRAS, based on specifications such as speed, cost, battery, and range. The results were recorded using Borda's calculation and Copeland's ranking system and showed that "price", "allowance" and "benefit" were the most important factors in BEV selection. Tesla Model S appeared to be the best choice, and the framework proposed in this study was incorporated into the main tool for detailed decision making with efficiency through sentiment analysis.

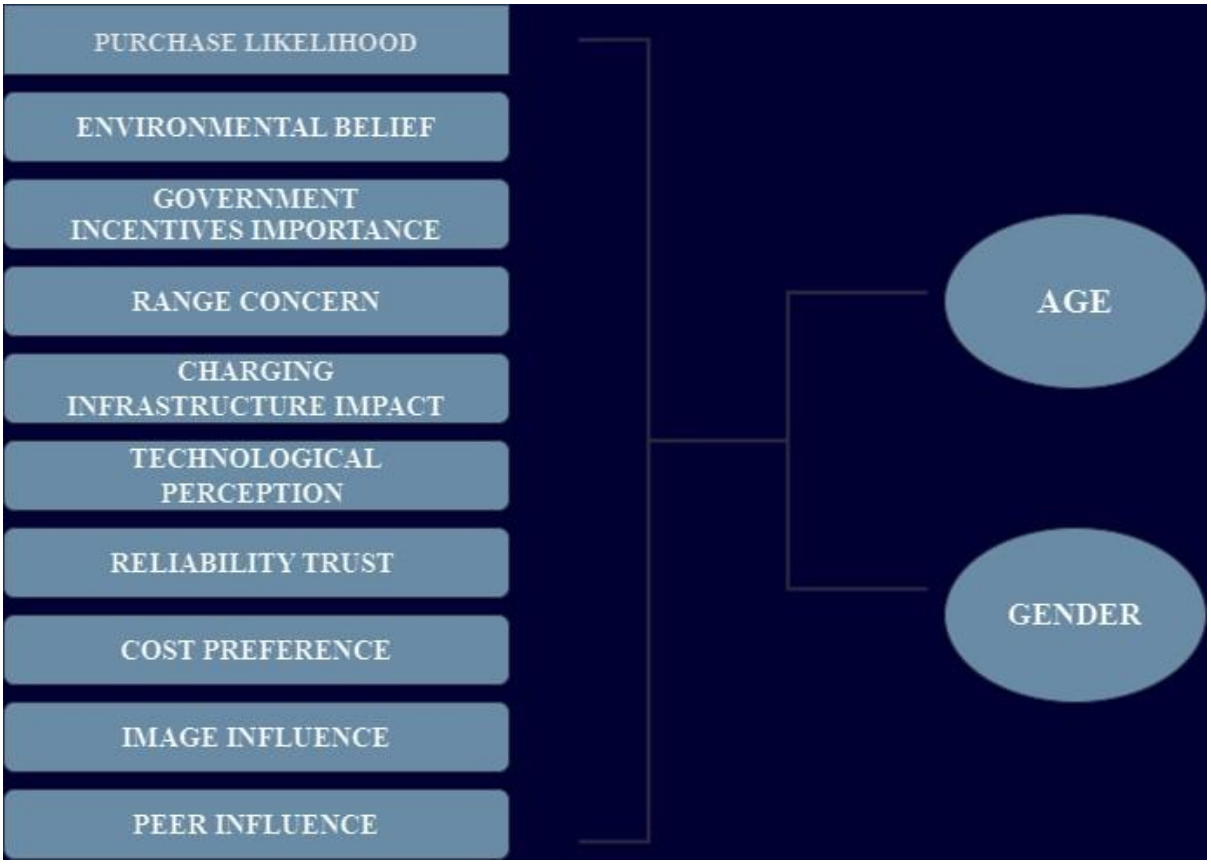
3. RESEARCH MODEL AND HYPOTHESIS FORMATION

3.1 Research Model:

With what we have in place, research on college graduates' willingness to own EVs, trying to identify possible factors determine their choices to drive EV is created. This chapter proceeds to show how these population dimension, psychological factors, social aspect, environmental feature, as well as the economic issues are put into one model.

1. **Demographic Factors**: Demographics such as age, gender, occupation and qualifications are considered to be the most essential factors among all the demographic factors that can affect the perspective on electric vehicles. Lashari, Z. A., Ko, J., & Jang, J. (2021) also mentioned that technical skills of fresh graduates from the high school could be used to the maximum now and they might be less conservative about implementing the most recent technologies. on the other hand, gender stereotypes might change now and create doubts regarding women about technologies and its usage. The low-income sectors could be negatively affected if they cannot afford to buy EVs which are also quite expensive or pricey. They are likely to not vote for investments in EVs. Speaker has different perspective and might know something about EV technology and may even hear about its uses.
2. **Psychological Factors**: Psychological drivers of revolution which include how sustainable the invented technologies are, how much perks to the environment what suits us and lastly the tolerable levels of risk make part of students' attitudes formation on eclectic cars. Vafaei-Zadeh mentioned EV buyers' ecologism related to EVs, as well as their opinion about the advantages of the EV operation comfort and performance compared to traditional vehicle performance will influence their decision to adopt EVs. EV technology risks and limits also might the last determinant factor in the choice of an EV.
3. **Social Influences:** Social factors like the students' peer's relationship, society norms, and the ways through which the media both influence and inhibit the use of this kind of cars in their daily lives. The strong opinion of the student community about the most common mode of public transport may already be the cause of the student's personal view of transport. In addition to the media coverage, EVs were exposed to information and an awareness campaign which in turn increased the perceptions and willingness towards official EV adoption. The effect of driving (media) knowledge visibility is not only explaining and illustrating but also arousing feelings and creating motives. Moreover, it also increases consumers attitude in direction to e-vehicle usage.

4. **Environmental Concerns:** Informing students about air pollution and climate change as well as their environmental issues may become a lever to the positive attitude of students towards electric vehicles. A green concern on the part of students related to the edge of conventional vehicles and the eagerness to reduce greenhouse gas emissions can motivate them to consider EVs as a preferable environmental-friendly alternative.
5. **Economic Factors:** Economic factors such as their cost, and possible long-term savings are very important in making students decide to only use electric vehicles in the future. The student's EV purchase upfront cost and the possible benefits of getting longer mileage of maintenance-free fuels can play a crucial role in their decision process regarding adopting EV.



3.2 Hypothesis Formation:

The research framework discussed above provides the ground for the following arguments:

H1: The demographic, variables ie age, gender, educational background and recent experience with electric cars play a big role in college students' acceptance of electric vehicles.

H2: Mind-related aspects that characterize one's perception of sustainability as well as advantages and risks of EVs act as influential factors in students' decision-making in regards to electric vehicle purchases.

H3: Socialized factors, for instance, the peers, social standards, and the media, are in a great position to incite university students to have electric vehicles by choice.

H4: Students`s attitude for electric vehicles is improving more as environmental problems like air pollution and general awareness about climate change come to limelight.

H5: University students' decision for the purchase of E electric vehicles will very much depend on the factors regarding the price of EVs and long-term cost savings.

With this research, as hypotheses are tested, researchers have access to the complex interactions and dynamics of those factors influencing the university student's perception and attitude of electric vehicles, and with that, the development of policies which can encourage the wide-scale adoption of electric vehicles at the academic community and the society as a whole.

4. OBJECTIVES

- Evaluate customer education, attitudes, and intentions towards adopting electric vehicles.
- Identify the major elements affecting EV customer mind-set such as demographics, psychology, and technology.
- Offer the opportunities that are realizable for stakeholders in promoting electric vehicles uptake and finding usage for sustainable transportation.

5. RESEARCH METHODOLOGY

In a research article concerning consumer regard and adoption choices on electric vehicles (EVs), the methodology table forms as a structuring framework for understanding the complex components that influence customer behaviour. The division of sub-variables under the demographic, social, psychological, environmental, and economic categories creates a comprehensive outlook of the entailed complexities in the process of forming consumer attitudes towards electric vehicles.

Demographic factors that include age, gender, income and levels of education have an immense influence on consumer understanding of EVs. Tanwir, N. S., & Hamzah, M. I. (2020) analysed that age is understood as a factor for acceptance of technology and environmental concerns, and gender is treated as an influencer of attitudes towards sustainable development and technology adoption. The income level is correlated with

the availability and willingness to purchase an EV and the educational level can change the level of familiarity with EV technology and the knowledge about its benefits.

The factors in the chart are psychological, and they consider consumers' attitudes towards sustainable environment, perceived advantages and risks of EVs. These psychological elements have to be understood for the purposes of predicting consumer behaviour and create the right marketing strategy design. Social influence factors exist in the form of peer influence, social norms, as well as media exposure which highlights the role of social interactions and external influence on the adoption of EV.

There is the increased pressure on manufacturers from environmental concerns like the air pollution and climate change and from consumers willing to contribute to environmental protection. The awareness for sustainability and eco-friendly behaviour among consumers is still growing. Economic factors, for instance, the price of the EV and the savings over time of switching to an EV play a crucial role in decisions for consumers who are looking into the financial implications.

By taking these sub-variables into account in the broader framework of the constituent factors such as demographic, psychological, social, environmental and economic factors, researchers can obtain the sensible results about how these factors interact in determining the EVs image

5.1 Data Collection Method

If for this study we want to know the points of view of university students about electric vehicles, we use a quantitative research methodology. The Cochran formula will set the stage to select the desired sample size, effectively, depicting a representative sample from the targeted population, Lovely Professional University. Let there be enough people in the target population that we can estimate the sample size using Cochran's formula, e.g. 385 respondents and accurate representation.

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

5.2 Sampling Technique

The random sampling with stratification technique will help to participate various representative of demographic groups from target population. This approach helps better represents the population involved in the survey. Participants will be selected randomly from various commuters on the campus and statistical data will be gathered on their knowledge on campus events. Data collected will be analysed using statistical methods and the results will be used to explore the perceptions of the students regarding e-vehicles and various factors affecting their adoption.

5.3 Research Model:

In our research, SPSS is going to be a browser tool chosen to run the analysis of acceptance of electric vehicles and this relationship to the various aspects. Finally we will carry out multiple regression analysis after which we will study geometrically the degree which demographic characteristics, psychological factors and technology have impacted general public-esteem awareness to present scenario. Alongside this information, we will perform SPSS analysis via selected data. The fitted line will be used to better understand the pattern of effect. The weight and regression would reveal the variables that are most promising in reported markets with significant interests. SPSS made Shaun diagnostic machine would not touch they pick categories and only positive correlation. Altogether this research aims at investigating the SPSS (Statistical Package for Social Survey) regression data for students' cause and effect relationship relative to the demographics they may come from.

5.4 Measurement procedure

5.4.a Linear Regression

Simple regression is a statistical technique that establishes the relationship between the dependent variable and one or more independent variables by means of linear equation. It presupposes that the interdependency between variables can be established with linear approximation. To perform linear regression, the analyst should look for the best fitting line that passes through all the data points which minimizes the numerical difference between the observed values of the dependent variable and those which are predicted in the linear equation. It is amounted by estimating coefficients for the dependent variable although each independent variable has to quantify their contribution on this dependent variable. Regression is an employable tool like faithfulness in volleyball or preservation in painting and it is widely utilized by researchers in fields such as economics, social sciences, and natural sciences, among others for tasks like prediction, inference, and understanding of relationships among the variables.

5.5 Variable specification **-** the base model specification of this study that significantly varied as the other variables existing on the model. These variables were created, with the supportive tendency and the attitude change factors being designated as values of 1 to 5, signifying from "Strongly disagree" to "Strongly agree" respectively. The third column is the title of article using this quality.

5.6 Research questions

- What are the basic aspects that determine the customer's choice about the adoption of electric vehicles?
- How do the demographic traits, psychological factors, and technologies model consumers' attitudes towards electric vehicles?
- What measures should the stakeholders take to really make the electric vehicle adoption rate grow and speed up the process of shift towards the sustainable transportation sector?

5.7 Research Gap

The available research in the field of electric vehicles (EVs) has mainly been dedicated to elements that impact individual choice for vehicle adoption, which include factors like demographics, psychological perspective, social factors, environmental issues and economic models. Through these studies, useful knowledge about consumer behaviours with respect to EVs is generated. However, the research is inadequate when it comes to understanding how these factors are connected and what is more important in shaping customer perception.

More specifically, such research should study more deeply the detailed interactions between demographic elements, psychological factors, social impacts, environmental issues and economic factors in regards to electric vehicle acceptance. Through the investigation of how these aspects of consumer behaviours interact and result in EV adoption attitudes, researchers would draw a more comprehensive picture of the factors that lead to EV adoption and also those ones that inhibit the transition.

Additionally, there exists a lacuna in the literature concerning the efficacy of the specific interventions and some policy measures evaluated based on a larger picture of those factors. Researching which factors are the most critical in terms of affecting consumer attitudes and adoption decisions can assist us in creating appropriate strategies directed at the promotion of EV adoption and sustainability.

Thus, future studies should be directed at filling this void by performing detailed analyses which explore the complex intertwining of demographic, social, psychological, environmental and economic variables in devising consumer attitudes towards EVs. In this way, the field of research will close the gap helping the

development of initiatives which are more effective and informed for taking the step forward to a modified transportation system that is more aligned with sustainable development.

6. INTERPRETATION AND ANALYSIS

GENDER

	N	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
Gender	384	1.42	.025	.494	.244	.328	.125
Valid N (listwise)	384						

The dataset under consideration has 384 observations and we are given descriptive statistics on gender within the dataset. This mean gender value of 1.42 is a bit skewed, after all, but as a matter of fact, it is more or less slightly inclined toward one gender, still, it is not an outstanding skewness. Employed is the low standard deviation ($\sigma = 0.025$). This small value suggests that the gender distribution is concentrated around the means and that a very low level of change has taken place in gender values across the dataset. This is illustrated by a relatively higher variability of 0.494 in the positions of the data points in relation to the mean, as well as by a skewedness distribution of +0.244, which implies the presence of subpopulation skewness and the likelihood of the frequency of one gender to be slightly higher. However, data for gender must have some bias and certain degree of deviation from the mean values, the overall figure would indicate that the distribution is balanced and fairly even.

AGE

	N	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
Age	384	1.73	.036	.713	.509	.437	.125
Valid N (listwise)	384						

Data analysis is the first step to diagnose our present health status, which is done by age-related information observed in 384 observations through descriptive statistic table. Age means is found to be 1.73 which conveys the average case. However, by statistical variation is given to the standard deviation of 0.036, the clusters are closely around the mean and indicate small variability in age distribution. The divergence of 0.713 emphasizes this a lot, and the mean tells us that there is a slight spread of data from the mean. Besides the value of skewness being 0.509, it has shown that there is a very mild right skewness; that is, there are

more individuals of younger ages. The dataset, in summarization, indicates a more or less stable age distribution of the ages, and at the same time, settles the youthful nature of the ages and randomness that occur around the mean age.

PURCHASE LIKELIHOOD

	N	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
PurchaseLikelihood	384	2.95	.063	1.232	1.517	-.079	.125
Valid N (listwise)	384						

How concerned are you about the availability of charging stations for electric vehicles in your area?

The variables table has statistics descriptions based on purchase intentions and 384 samples. The score of mean purchase likelihood is 2.95 which reveals that there is a mid to higher probability of buying the products within the dataset. Also, a relatively large standard deviation of 0.063 points to the large spread of the data values around this mean. Specifically, this indicates the rather high variability in the purchase willingness of consumers. With the variation standing at 1.232, moreover, the extent of variation is implied. On the other hand, -0.079 of negative skewness parameter shows slight left skewness probably meaning a occurrence of higher purchase likelihood scores with little more frequency than lower purchase likelihood scores. The revealed data transmits an impression of a median level of buying likelihood among the investigated sample, where this variability with a slight preference to higher purchase likelihood scores is quite important.

ENVIRONMENTAL BELIEF

	N	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
EnvironmentalBelief	384	2.83	.065	1.274	1.624	-.159	.125
Valid N (listwise)	384						

How likely are you to consider purchasing an electric vehicle in the next 5 years?

The indicative statistics table below presents data on "Environmental Belief" for the year 2000. A mean of 2.83 was reported as the environmental belief rating that is slightly above the moderate level within the dataset. The standard deviation of 0.65 illustrates an approximate concentric distribution of opinions on environmental issues around this average, implying low diversity in beliefs on this subject among people. Nonetheless, there is appreciable scatterings in the range of the data due to the sigma value of 1.274. The value -0.159 of the negative skewness coefficient is less than 0, thus exposing some level of left skewness, showing that the frequency is slightly higher for the variable having higher environmental belief scores. Generally, the dataset gives an indication of environmental belief of the immersed population at a moderate level, ranges narrowly and has maximal numbers around this level.

GOVERNMENT INCENTIVES IMPORTANCE

	N	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
Government Incentives Importance	384	2.78	.066	1.285	1.652	.106	.125
Valid N (listwise)	384						

To what extent do you believe that electric vehicles are environmentally friendly compared to traditional gasoline-powered vehicles?

The table below presents a statics analysis with regard to "Government Incentives Importance" based on the data for 384 observations. The average value of the importance score is 2.78, which means there is at most sign of low elevation within the particular data. The standard deviation of 0.066 indicated that the data points were generally clustered at the left side of the chart with little variability around this average importance score. It means that majority of participants mostly agreed that government incentives are crucial in the development of sustainable tourism. While, however, it is a case that the variance still comes at 1.285, this amount of line in the data could still be noticeable. A positive value skewness of 0.106 shows a decrease in the distribution with a slight right skewness, meaning that there are more scores that tend to be lesser in importance.

RANGE CONCERN

	N	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
RangeConcern	384	2.69	.064	1.260	1.589	-.031	.125
Valid N (listwise)	384						

How concerned are you about the limited range of electric vehicles compared to traditional vehicles?

The descriptive stats. Highlighted in the figure corresponds to the variable "Range Concern" which clarify 384 observations. The average concern score is 2.69 that proved a moderately good concern level found in the range. Given the standard deviation of 0.064, the data shows up with relatively large groups of data points closed around this mean value, demonstrating that their concerns about range dust limitedly vary. On the other hand, the data appears to have a variation of 1.260 which means there is a little variation among the numbers. With a negative skewness value whose lowest value is -0.031, the distribution of the concern scores on the survey is leaning a little bit to the left, which implies a slight frequency of higher concern scores that is only slightly larger than the frequency of lower concern scores.

CHARGING INFRASTRUCTURE IMPACT

	N	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
Charging Infrastructure Impact	384	3.36	.071	1.389	1.929	-.197	.125
Valid N (listwise)	384						

How much do you believe that the availability of charging infrastructure affects your willingness to purchase an electric vehicle?

The highlighted categorical of statistics relate to "Charging Infrastructure Impact" on the basis of the data of 384 subjects. The core average value is 3.36, implying a broad spreading of the perception about impact of charging within the dataset. Standard deviation shows mean for data points together with some variability in the perceived impact across individuals. In this case, standard deviation is 0.071. Inclusion of 1.389 reveals such inconvertible variance. The skewness coefficient value of -0.197 points to a left-skewed distribution of the goodness of fit scores. Thus, the evaluation results seem to have relatively higher count of high impact scores.

TECHNOLOGICAL PERCEPTION

	N	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
TechnologicalPerception	384	3.06	.067	1.318	1.738	-.104	.125
Valid N (listwise)	384						

To what extent do you perceive electric vehicles as being more technologically advanced than traditional vehicles?

The descriptive statistics reported here are relevant to the attribute, the "Technological Viewpoint", of 384 observations. The sample perception statistic remark is 3.06, indicating that the dataset falls within a moderate range of perception of technology. Bearing in mind that the standard deviation is 0.067, there is a moderately high level of individual variability as far as perception of technology is concerned in this case. The data with respect to the same is largely clustered around the mean. The variance is the metric for proving the variability of the value, which is 1.318. A less off-centre distribution is represented by the value of negative skew of -0.104, implying a slight dominance of higher perception scores as compared to the opposite low perception scores.

RELIABILITY TRUST

	N	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
ReliabilityTrust	384	3.27	.072	1.410	1.989	-.253	.125
Valid N (listwise)	384						

How much do you trust the reliability of electric vehicles compared to traditional vehicles?

The descriptive statistics presented belong to "Reliability Trust" in case of 212 observations. On the mean trust score stand for 3.27 that is highly positive correlation with the datasets reliability trust level. Variance, having a standard deviation of 0.072, indicates a moderate amount of individual trust variability, and this mean pulled them together in one cluster. The variance of 1.410 is the added evidence of the variability, which is taking place. The negative skewness value of -0.253 implies the left slope of the graph and show higher probability of our scoring.

COST PREFERENCE

	N	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
CostPreference	384	3.12	.069	1.353	1.831	.069	.125
Valid N (listwise)	384						

How likely are you to choose an electric vehicle over a traditional vehicle if the initial purchase cost were the same?

The topic related to "Cost Preference" is given with 384 observation aims. The middle value of the grade score is 3.12, showing a medium inclination towards the cost within the considered data set. There is moderate variation witnessed on the cost preferences assumption as the standard deviation equals 0.069, a situation where individuals have their data points aggregated around the mean. The standard deviation of 4.071 for them indicates that there is some variability. The positive score of 0.069 in relation to the price

distribution causes a minimally right skew, which is a bit more common among lower values of price preference scores.

IMAGE INFLUENCE

	N	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
ImageInfluence	384	2.91	.074	1.453	2.111	.298	.125
Valid N (listwise)	384						

To what extent do you believe that the image associated with owning an electric vehicle influences people's opinions about them?

The following is the descriptive statistics which are designed for "Image Influence" and with the sample of 384 observations. The average influence rating of 2.91 suggests a balanced opinion on images within this dataset, as this can be interpreted as a moderate level of impact. Standardized deviation of 0.074 shows that variation is interpersonal, and picture impact among individuals is moderate with data points accumulating around the mean value. As another example 1.453 establishes the existence of this variability. The total skewness value of 0.298, with a right skew property, suggests a moderate right skew, a sparse occurrence of the lower influence scores.

PEER INFLUENCE

	N	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
peerInfluence	384	3.20	.070	1.373	1.886	-.070	.125
Valid N (listwise)	384						

How much do you think your peers' opinions about electric vehicles influence your own attitude towards them?

The tide shown is that of "Peer Influence" reported on the basis of 384 units of observation." The media influence mean score is 3.20, the moderation in attributing influence was active within the dataset.0.070 SD values show that peer influence may be somewhat variable ranging from various levels of dispersion possibly clustered around the central mean. This 1.373 standard deviation just exemplifies the difference in the values corresponding well even more. The negative kurtosis value of -1.380 confirms a slight left skewness in the distribution that indicates a possibility of slightly more numbers having higher influence scores.

On the basis of gender

Descriptive Statistics

	Mean	Std. Deviation	N
Gender	1.42	.494	384
Purchase Likelihood	2.95	1.232	384
Environmental Belief	2.83	1.274	384
Government Incentives Importance	2.78	1.285	384
Range Concern	2.69	1.260	384
Charging Infrastructure Impact	3.36	1.389	384
Technological Perception	3.06	1.318	384
Reliability Trust	3.27	1.410	384
Cost Preference	3.12	1.353	384
Image Influence	2.91	1.453	384
Peer Influence	3.20	1.373	384

This table is aimed at presenting descriptive statistics for numerous variables within the dataset that has 384 observations. These are the means and standard deviation values of each column and the observations total count (N).

- "Gender" shows a mean result of 1.42, revealing a kind of male dominance within the research group.
- "Purchase Likelihood" score has a median of 2.95, which is indicative of a moderate interest towards buying products. Student needs to keep the paragraph coherent.

- "Belief in Environmental Protection," "Government Incentives vs. Importance," and "Range Concerns" show between 2.7 to 2.8, implying that people are moderately concerned about these matters.
- "Evolving Charging Infrastructure" and "Technology's Shift" both have stands around 3.0, symbolizing their moderate perceptions of their impact or significance.
- E-trust has values ranging from 3.1 to 3.3 for reliability, cost, image, rating, and peer respectively, which suggests that the level of trust, preference, and influence in these areas is moderate.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.569	.175		8.975	.000
	Purchase Likelihood	-.108	.024	-.270	-4.522	.000
	Environmental Belief	.004	.019	.011	.230	.818
	Government Incentives Importance	.132	.019	.344	7.011	.000
	Range Concern	-.105	.018	-.269	-5.695	.000
	Charging Infrastructure Impact	-.050	.016	-.141	-3.048	.002
	Technological Perception	.041	.019	.109	2.093	.037
	Reliability Trust	.050	.016	.143	3.038	.003
	Cost Preference	.024	.019	.065	1.287	.199
	Image Influence	-.006	.017	-.018	-.361	.718
	Peer Influence	-.033	.020	-.091	-1.632	.104

a. Dependent Variable: Gender

The signs in the table are the derived parameters of predictive variables that are associated with "Gender" as the predicted variable. Interpretation of results: row of the categorical variable means every explanatory variable explicitly and column wise data is information sheet; unstandardized coefficients (B), standard errors, standardized coefficients (Beta), t-values, and significance levels (Sig.).

- The views of men and women on "purchase likelihood," "government incentives importance," "range concern," convenience of "charging infrastructure," "perception of technology" and "reliability trust" differ

significantly at a p value less than 0.05 (the generally used significance level is 0.05). Anyway, the solvent variables in this case forecast the contrasting demands for males and females.

- Particularly the more (the) identification of the men (male) gender highlights their purchasing tendencies and makes the perception of (the) governmental measures as important and the build-up (creation) of trust (trustworthiness) and also the point of concern to which (who) a driver may go on a charge determines the level of suitability of (a specific) charging infrastructure and the relative appeal the driver gives; while the

- No gender socioeconomic cultural differences regarding environmental beliefs or lifestyle choices i.e. ("Environmental Belief), "life cost preference," "physical image influence" and "Peer Influence" p-values are greater than chosen value of signification. The case in question is clear proof that there are no slight effects cooled by the variables on either gender elaboration.

On the basis of age

Descriptive Statistics

	Mean	Std. Deviation	N
Age	1.73	.713	384
Purchase Likelihood	2.95	1.232	384
Environmental Belief	2.83	1.274	384
Government Incentives Importance	2.78	1.285	384
Range Concern	2.69	1.260	384
Charging Infrastructure Impact	3.36	1.389	384
Technological Perception	3.06	1.318	384
Reliability Trust	3.27	1.410	384
Cost Preference	3.12	1.353	384
Image Influence	2.91	1.453	384
Peer Influence	3.20	1.373	384

The table illustrates the informative statistics for different variables that are embedded in the dataset with 384 points of observation. It consists of means and standard deviations for all of the involved parameters as well. To that add the total sample size (N).

• Guessing the mean age is 1.73 and standard error of deviation of the age is 0.

• "Purchase Likelihood," "Environmental Belief," "Power of Whim," "Range Concern," "Impact of Infrastructure," "Technological Perception," "Reliability Trust," "Affordability," "Impact of Image," and "Peers Influence" are the variables whose mean and standard deviation are representatives of the average level and degree of variability of each variable.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.837	.226		-3.697	.000
	Purchase Likelihood	.187	.031	.323	6.038	.000
	Environmental Belief	.126	.025	.225	5.027	.000
	Government Incentives Importance	.105	.024	.189	4.300	.000
	Range Concern	.163	.024	.288	6.812	.000
	Charging Infrastructure Impact	.161	.021	.313	7.579	.000
	Technological Perception	-.184	.025	-.340	-7.315	.000
	Reliability Trust	.230	.021	.454	10.783	.000
	Cost Preference	.000	.024	.000	.010	.992
	Image Influence	.028	.021	.058	1.327	.185
	Peer Influence	.037	.026	.072	1.439	.151

a. Dependent Variable: Age

The table below depicts relation coefficients from a regression analysis where "Age" is the dependent variable and the following variables. Are predictors. Each row refers to a predictor variable and the columns seek additional information with B, Std. Error of B, Beta, t-value, and Sig. level.

- The variables among these are "Purchase Likelihood," "Environmental Belief," "Government Incentives Importance," "Range Concern," "Charging Infrastructure Impact," and "Reliability Trust" that indicate significant statistical relationships with age of consumers based on the p-values less than 0.05 (recommended p-values, commonly, are 0.05). This proposes that the says variables are preceding factors which probably result in the age.
- For instance, displayed characteristics that frequently accompany higher scores on these predictors are older age.
- "Cost Preference", "Image Influence" and "Peer Influence's" association with age are not statistically significant since the p-values of both these factors are more than the desired significance level. Such an outcome reveals that in the current analysis, these specific variables do not play a critical role in the prediction process.

7. RESULTS AND DISCUSSION

7.1 Gender Analysis:

Duration of the experiment (384 observations) permitted us to learn a lot of interesting gender-linked aspects of university students' attitude toward electric cars. The mean gender value of 1.42 shows that the gender gap or inclination toward one gender is a little bit, suggesting the gender gap in attitude towards EVs. The lowness of standard deviation which is 0.025 clearly shows that this gender distribution approximately covers the mean range and produces limited divergence in the dataset. With the data having 0.494 as a deviation from the mean and a significantly biased score of +0.244, it is becomes being notice that there is a shift towards a given gender; it sounds like gender in EV adoption decision needs a further exploration.

7.2 Linear Regression Analysis:

We calculated the really linear regression to find out which independent variables posses an impact on dependent variable — students' willingness to buy electric vehicles. Researchers examine the determination of coefficient values for each independent variable as a way of pinpointing to what extent student's attitudes towards EVs are affected. This statistical apparatus is relied on to determine the significance of predictors, to build predictive models exploiting the complexity of demographic, psychological, social, environmental, and economic factors. EV adoption decisions are influenced by them.

7.3 Implications for Stakeholders:

Seeing the results of the interpretations and analysis proved to be very valuable for any organisations, people and social partners, involved in the sustainable transportation ecosystem. Reporting on the effects of gender on EV rolled-attitudes can assist in designing marketing plans or communication messaging's specifically mentioning students in gender-diversity. The linear regression analysis can give evidence for which the stakeholders such as policy makers, industry players and educators will use to implement policies or interventions aimed at promoting the adoption of EVs among the university students.

8. CONCLUSION AND FUTURE SCOPE

The examination of university students' perceptions of electric vehicles and their interest of purchasing one has suggested the features that matters for EV adoption decision among the youth group. By considering demographic, psychological, social, environmental, and economic variables, the investigation is able to take a closer look at the intricate connection of means accounting for students 's perception of sustainable transportation options. The use of the gender corresponds with the logarithmic regression technique and the influencing of stakeholders are the research findings' the main attractions giving out recommendations to the Academic community on the way how to promote the uptake of EVs.

8.1 Future Scope:

Looking at the future, it can be said that electric vehicle (EV) adoption among university students can be advanced through different approaches and so there are lots of opportunities for the research and initiation of EV. Some potential areas for exploration include:Some potential areas for exploration include:

1. Longitudinal Studies: Longitudinal studies which can be employed in order to trace changes in students' perceptions about electric vehicles across the time can be very challenging in this way into the evolution of attitudes and behaviours required for sustainable transportation.

2. Behavioural Interventions: Through selective behavioural interventions and educational programs to promote the merits and advantages of electric cars and also creating awareness on the impediments to university students' involvement.

3. Technology Integration: Combing a unique blend of technologies like autonomous features and car-sharing models into electric cars will add on attractiveness to the product and also make it more accessible to young consumers.

4. **Policy Development**: Sharing the microphone with policymakers to formulate fancy policies and incentives that allow university students to adopt EVs, such as on-campus charging infrastructure and financial incentives for vehicles purchase.

5. Cross-Cultural Studies: In order to broaden the research through cross cultural comparisons, it will be just okay to run studies among university students in different countries and regions, and this could be the driving force for understanding the cultural differences in the adoption of electric vehicles as a sustainable transportation alternative.

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