

Use of Electric vehicles for environmental sustainability: Investigating the perception of the students using the Extended TAM Framework

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ABSTRACT

Classes that promote the use of green campuses through decarbonization expand students' understanding of carbon capital within TAM. The world is experiencing rapid technological advancement, and the transition from old to new technologies is dominating the global environment. This trend is increasing as people adopt new technologies and promote progress in all aspects of human life. Global demand for electric vehicles (EVs) is driven by concerns about global warming, pollution, and depletion of limited resources. While many countries are transitioning to electric vehicles, India faces major challenges due to its large population. Many states in India have introduced EV policies to attract manufacturers, encourage production and use, and create awareness. In this study, students' understanding, and knowledge of electric vehicles are explored through research. This study uses user surveys to understand the adoption process and increases user acceptance through the Technology Acceptance Model (TAM). The main goal is to understand and predict consumer demand for electric vehicles. An online survey of 154 students at the Uniform Artificial Intelligence University (UAIU) found that EV adoption is influenced by variables such as energy efficiency, ease of use, reliability, attitude, intention to use, and environmental friendliness. These results provide insight and guidance for policymakers and business leaders using electric vehicles and help develop solutions for school and off-campus transportation.

Keywords: Electric vehicles, Green campus, Decarbonization, Environmental Sustainability, TAM.

1. Introduction

Transportation accounts for a significant portion of energy consumption and faces many challenges, including exhaust emissions, traffic congestion, and environmental degradation. (Haider Ali Abbasi, January 1, 2021) Rising oil prices and increasing energy demand pose serious challenges to economies that have long relied on oil as their primary energy source. Transportation accounts for nearly a third of global carbon dioxide emissions, according to a 2016 report from the International Energy Agency. This figure is expected to increase from 23% to 50% by 2030. As a result, transportation functions will become an important part. economy. Obstacles to a sustainable economy. According to the Intergovernmental Panel on Climate Change (IPCC), commercial industries have played a significant role in global warming since the mid-20th century. (Rima Fayad, 2015) It is important to note that the transportation sector is the largest consumer of domestic petroleum products, accounting for 55% of total domestic consumption and approximately 7.5% of CO₂ emissions. As of 2019, India ranks 5th in the world for air quality, with 21 of the 30 most polluted cities in the country. (Hussain, 2015) In response to this situation, the Ministry of Heavy Industry and Public Enterprises launched the FAME program in 2015 to promote the production and promotion of eco-friendly vehicles, including electric and hybrid vehicles. To address India's growing transportation challenges, the National Electric Mobility Plan (NEMMP) proposes a combination of electric vehicles (EVs) with hybrid and plug-in hybrid technologies. (Kasha, 2020) The main goal of NEMMP (2020) is to improve fuel safety and increase the use of electric vehicles by encouraging the use of electric and hybrid vehicles instead of conventional vehicles. The use of electric vehicles has the potential to contribute to the decarbonization of transport by reducing CO₂ emissions. The pace of electric vehicle adoption will therefore play a key role in determining whether the world meets its CO₂ reduction targets. (Haider Ali Abbasi, January 1, 2021) The Indian government provided incentives such as subsidies and tax breaks to encourage the purchase of electric vehicles. India's payment center network continues to expand. Electric

vehicle prices are falling, making them more affordable for consumers. These factors are expected to accelerate the adoption of electric vehicles in India in the coming years. This will help reduce India's dependence on fossil fuels and improve air quality. Despite various government initiatives and tireless efforts by auto manufacturers, the adoption of electric vehicles (EVs) by Indian consumers remains low, hampering economic growth. According to the recently released India Energy Outlook 2021 report, less than 4,000 electric vehicles were sold in India in 2019, which is a low figure. A major factor preventing India from meeting its electric vehicle (EV) production targets soon is the shortage of precious lithium. Used to manufacture cathodes and batteries for electric vehicles. This shortage has left us dependent on China for the export of this important medicine. (Masrom, 2007) This study demonstrates understanding of home appliances in an uncertain environment. The goal is to analyze decisions affecting consumer satisfaction to increase market penetration of electric vehicles. Despite the growth of electric vehicles, their market share is still low. Therefore, this study focuses on analyzing strategies to increase consumer interest in electric vehicles. This study uses a behavioral theoretical framework, the Technology Acceptance Model (TAM), to investigate the factors and conditions that influence consumers' willingness to purchase electric vehicles to provide a better understanding for future researchers.

2. Research Objective and Scope

- To understand consumer demand for electric vehicles through students' perception of the use of electric vehicles.
- To understand the adoption process and increase user acceptance through the Technology Acceptance Model (TAM).
- To understand the knowledge of electric vehicles among students and analyze the perception of environmental sustainability by using Electric vehicles.
- The study aims to assess the level of awareness among students regarding decarbonization initiatives and the adoption of electric vehicles.
- Investigating the factors that influence students' attitudes and intentions towards using electric vehicles, such as energy efficiency, ease of use, reliability, and environmental friendliness.
- Utilizing the TAM framework to analyze students' acceptance of electric vehicles, considering variables like perceived usefulness and ease of use.

3. Importance of research

The study focuses on promoting green campuses and decarbonization, which are important aspects of combating global warming and reducing pollution. By understanding students' perceptions of electric vehicles (EVs) and their willingness to use them, this study contributes to the broader goal of achieving environmental sustainability. Findings from this study can inform policymakers and business leaders about factors influencing electric vehicle adoption among college students. This understanding can help design effective policies to encourage the use of electric vehicles, including incentives for manufacturers and users, infrastructure development, and education campaigns. Because this study is conducted among students, it has implications for educational institutions seeking to increase environmental awareness and sustainability. Understanding student attitudes and intentions toward electric vehicles can help colleges and universities develop educational programs and initiatives that promote green transportation choices on and off campus. Especially in the context of rapid technological advancements in the automotive industry, this study helps to understand the dynamics of the transition from traditional fuel vehicles to electric vehicles. By identifying the factors influencing electric vehicle adoption, this study provides insight into how to overcome barriers and accelerate the transition to cleaner transportation technologies.

4. Formulation of Hypotheses

1. PEOU will have a positive relationship with PU.
2. A positive relationship is observed between PEOU and ATU.
3. A positive relationship is observed between PU and ATU.
4. A positive relationship is observed between trust and attitude.
5. A positive relationship is observed between ATU and BI.

4.1 Advancement of Electric Vehicles:

According to information from the IEA (International Energy Agency), EV deals came to about 50,000 in 2022, 4 times more than in 2021, whereas adding up to car deals expanded by far below 15%. Burgeoning electric mobility companies are presently waging on the government's Generation Connected Motivation (PLI) scheme – with around USD 2 billion in endowment programs (Shin Liao, Jon-Chao Hong, Ming-Hui Wen, Yi-Chen Container, Yun- Wu Wu, 2018) – to incline up EV and component fabricating. This conspiracy has pulled in ventures totaling USD 8.3 billion. The Indian EV advertise is anticipated to develop at a whopping CAGR of 90 percent in this decade to touch \$150 billion by 2030. Agreeing to information on the government's Vahan site, around 9,89,000 EVs were enlisted with territorial transport workplaces in 2022 alone, demonstrating a more than

triple development from 2021 as of now. These figures make it clear that EVs may likely be gotten to be the standard for automobiles in the future. The showcase as of now remains adapted towards shared and littler versatility. In 2022, 25% of electric car buys in India were by armada administrators. In early 2023, whereas 55% of three-wheelers sold were electric, less than 2% of cars sold were EVs. The chart shows the development towards maintainability through the acknowledgment of electric vehicles compared to other nations like Thailand, Indonesia, etc.

4.2 Innovation Acknowledgment Model:

The Innovation Acknowledgment Demonstrate (TAM) was proposed by Davis in 1989, determined from the Hypothesis of Contemplated Activity proposed by Ajzen and Fishbein, (2001) and points to evaluate or decipher the utilization behavior of data innovation clients. Legris et al. appeared that the innovation acknowledgment demonstrated can generally clarify how outside components impact the inside “attitude”, “belief”, and “behavioral intention”. Davis proposed measurements of seen convenience (PU) and seen ease of utilization (PEU) to clarify and anticipate an individual’s acknowledgment of innovation and to analyze the components affecting an individual’s acknowledgment of modern data. TAM considers seen value and sees ease of utilization as autonomous factors, whereas it respects client demeanor, behavioral deliberate, and utilization behavior as subordinate factors. It advocates that seeing value and the ease of utilization will influence the attitude concerning innovation utilization, and in this way impact the behavior. As an implies of clarifying the client’s state of mind and behavioral deliberately, seen value and seen the ease of utilization will be influenced by outside variables. In expansion, the impact of outside factors is additionally talked about within the show. Seen ease of utilization is characterized as the individual’s supposition of the trouble of employing a specific framework. Seen value is characterized as the individual’s conviction within the advancement impacts of the unused framework on work productivity. Ease of utilization influences the user’s seen convenience of unused advances, and the two are emphatically related.

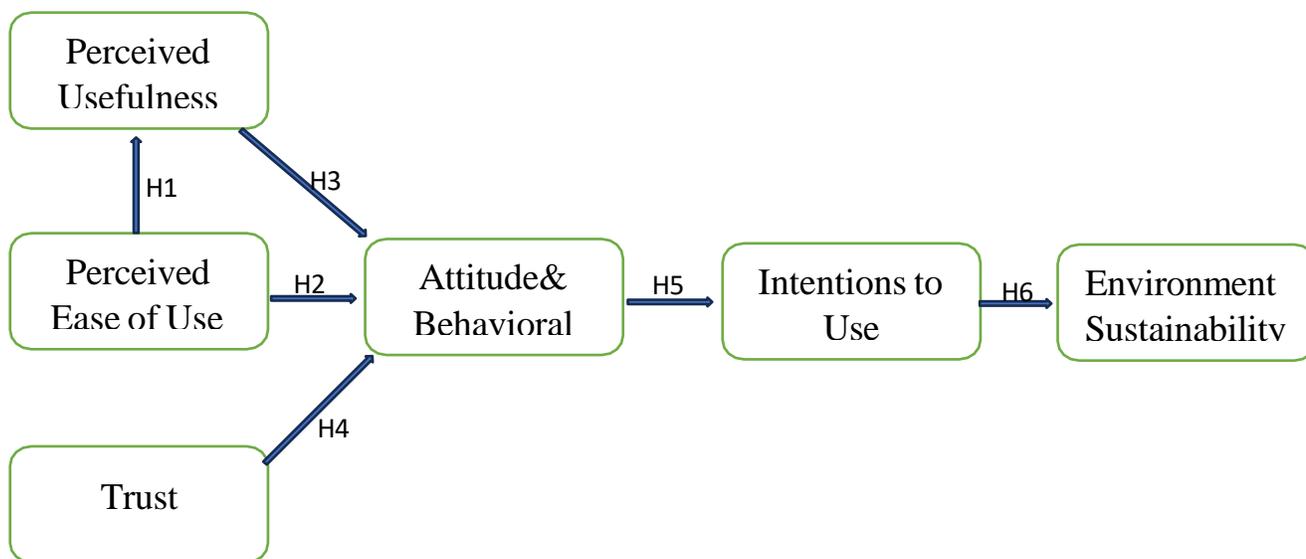


Fig 1: Research Model

In addition, the influence of external variables is also discussed in the model. Perceived ease of use is defined as the individual’s opinion of the difficulty of using a particular system. Perceived usefulness is defined as the individual’s belief in the improvement effects of the new system on work efficiency. Perceived ease of use affects the user’s perceived usefulness of new technologies, and the two are positively related.

4.2.1 Seen Ease of Use

Davis characterized ease of utilization as the degree to which individuals accept that utilizing certain frameworks would be easy. Venkatesh focuses on that clients frame early discernments of seen ease of utilizing a specific framework based on their common convictions concerning that framework and its utilization. In Electric Vehicle settings, ease of utilization is characterized as the extent to which one accepts utilizing electric vehicles to assist decarbonization and maintainable advancement. It provides the discernment of the student’s deliberate use electric vehicles to realize net zero emanations. The current clients are more likely to embrace and utilize Electric Vehicles on the off chance that they appear it simple to utilize. As such One found that seen ease of utilization had a critical influence on the behavioral purposeful of students’ recognition of Electric Vehicles.

H1: PEoU will have a positive relationship with PU.

4.2.2 Seen usefulness.

Perceived Value could be a key driver of utilization behavior and deliberate. Seen Value alludes to “the degree to which an individual accepts that utilizing a specific framework would upgrade his or her performance”. From the TAM viewpoint, it was proposed that individuals expected to act sometime recently they act, and the perceived value of data innovation is the most indicator of behavioral deliberation. Additionally, Cheong focused on the significance of seen convenience in tolerating modern innovation. So, clients who accept a positive use-performance relationship will cultivate the acknowledgment of innovation which will impact behavioral deliberation to utilize that innovation. Approximately EV setting, it can be expressed that seen value reflects the students’ convictions or desires approximately the result. This suggests that an EV acknowledgment with a high level of perceived convenience is one for which a client perceives (Placeholder1) (HUSSEIN, 2015; Yankun, 2020) d that there's a positive intention to utilize an Electric Vehicle. A critical body of earlier investigations has appeared that convenience includes a positive effect on behavior purposeful to the utilization of Electric vehicles by understudies. In this manner, those who discover Electric vehicles to be valuable are more likely to utilize them as a mode of transportation.

H2: Positive relationships will be observed between PEoU and ATU.

4.2.3 Demeanor towards utilizing EV

Public attitudes toward electric vehicles are impacted by a combination of natural consciousness, cost contemplations, government approaches, innovative acknowledgment, and the accessibility of a steady framework. As these variables advance, states of mind are likely to move, contributing to the continuous selection of electric vehicles.

H3: Positive connections will be made between PU and ATU.

4.2.4 Believe in utilizing EV

Trust plays a significant part in the acknowledgment and utilization of electric vehicles. This belief is built on a few components, counting headways in EV innovation, advancements in charging framework, and the unwavering quality and execution of electric vehicles. As innovation proceeds to advance, concerns related to run uneasiness, charging openness, and vehicle life span are being tended to, ingraining more noteworthy certainty in potential users.

H4: Positive connections will be watched between Believe and Attitude.

4.2.5 Purposeful to utilize EV

This calculation alludes to individuals’ eagerness and preparation to embrace electric vehicles for their transportation needs. Within the investigation conducted among 154 understudies at the all-inclusive Universal AI University (UAIU), the deliberate to utilize EVs is likely to impact components such as seen utility, ease of utilize, belief within the innovation, and in the general state of mind towards EVs. Student's deliberate to utilize EVs can be molded by their discernment of the benefits advertised by EVS compared to conventional gasoline-fueled vehicles, such as lower working costs, and decreased natural impact. Moreover, the developing accessibility of charging foundations, headways in battery innovation, and government motivating forces contribute to the appeal of electric vehicles. The cost-effectiveness of EVs over the long term, besides the potential for lower upkeep costs, includes the financial method of reasoning for their selection.

H5: Positive connections will be made between ATU and BI.

4.2.6 Environment Sustainability

Environmental Supportability develops as a key driver in forming students’ behavioral eagerness toward grasping EV innovation. The figure of natural Supportability envelops contemplations related to diminishing the carbon impression, moderating natural effects, and supporting eco-friendly initiatives. By centering on natural supportability inside the TAM system, the inquiry points to shed light on how students’ natural awareness impacts their acknowledgment of EVs. The inquiry about discoveries can highlight the positive connection between the deliberate to utilize EVs among understudies and the potential positive effect on natural supportability This knowledge is profitable for policymakers and marketers looking to advance green activities, improve client appropriation of EVs, and contribute to the improvement of Sustainable transportation arrangements on campuses and

H6: Positive connections will be made between BI and natural sustainability.

(Yang, 2019) This paper builds a comprehensive hypothetical show based on the TAM show and combines it with the seen hazard theory. They developed and advanced unadulterated electric vehicles, it is amazingly imperative to consider the impacting variables that influence users' eagerness to utilize immaculate electric vehicles.

(Hamidu, 2017) To complement this study comes about, analysts conducted a literary examination of existing EVs. This investigation pointed to recognizing and addressing major challenges, such as visit charging and the dependence on conventional fills. The objective was to plan a proposed EV that overcomes these challenges and gives a more engaging choice for potential clients in Ghana.

(Shin Liao, Jon-Chao Hong, Ming-Hui Wen, Yi-Chen Container, Yun-Wu Wu, 2018) distinguished the specialized aptitudes required for creating electronic books. Based on the discoveries, a web-based evaluation framework was made with 35 questions covering four angles of e-book generation. They consider utilized the Innovation Acknowledgment Demonstrate (TAM) to get how understudies in specialized colleges see and are expected to utilize this framework to survey their aptitudes in e-book generation. Moreover, the inquiry about utilized a Basic Condition Show to test theories, affirming that users' certainty in utilizing computers plays a part in their acknowledgment of the web-based appraisal framework. In easier terms, the consider found that understudies in specialized colleges are likely to utilize a web-based apparatus to assess their aptitudes in making advanced books, and their certainty in utilizing computers impacts their acknowledgment of the system.

(Rupak Rauniar, 2014) The paper investigates client states of mind and behaviors on social media, especially Facebook, by returning to the Innovation Acknowledgment Demonstrate (TAM). Through a study of 398 Facebook clients, the think about approving a changed social media TAM demonstrates joining variables like ease of utilize, basic mass, location capability, energy, dependability, and seen value. The discoveries emphasize the centrality of these factors in understanding client engagement on social media stages. The ponder contributes to the constrained observational inquiry about social media behavior and gives an approved instrument for surveying social media acknowledgment and utilization, helping convenience specialists and specialists in understanding client socioeconomics and motivations.

(Rima Fayad, 2015) This ponder proposes amplifying the Innovation Acknowledgment Show (TAM) for application in E-commerce by including four indicator factors: prepare fulfillment, result fulfillment, desires, and E-commerce utilize. Not at all like past TAM thinks about measured eagerly as a substitute for real behavior, this expansion recommends measuring real utilize factors, counting buy, getting to the number, getting to add up to time, and getting to normal time. The objective is to upgrade TAM's capacity to clarify genuine buyer behavior in E-commerce situations past its unique scope.

(Kasza, 2020) This study examines family nourishment squander designs in Hungary utilizing Halfway Slightest Squares Auxiliary Condition Modeling (PLS-SEM) with an agent test of 1002 grown-ups. Socio-demographic variables like wage, age, instruction, home, and locale altogether impact nourishment wastage. The state of mind demonstrates that cognitive, full of feeling, and conative states of mind affect nourishment squander, with the conative component being the foremost significant. Bits of knowledge from this think about advice Hungary's national nourishment squander anticipation campaign, "Wasteless," tending to EU enactment and proposals on nourishment squander reduction.

(HUSSEIN, 2015) This consider utilizes the Innovation Acknowledgment Demonstrate to investigate college students' states of mind toward E-learning. Studying 151 understudies comes about uncovering that state of mind essentially predicts students' purposeful to utilize E-learning. Recognizing the vital part of students' state of mind, the ponder points to improve the E-learning framework to superior cater to understudy needs and inclinations. The Malaysian government recognizes the developing request for E-learning in tertiary instruction but notes a need for eminent escalated in its usage.

(Hui Chen, WengeRong, Xiaoyang Ma, Yue Qu and Zhang Xiong, 2017) The flourishing e-gaming industry, impelled by mechanical progressions, especially in social systems and versatile administrations, has changed social associations and relaxation exercises. This investigates centers on WeChat, China's driving portable social organization, utilizing the Innovation Acknowledgment Demonstrate (TAM) to get it the factors impacting clients' deliberate play portable social recreations. By consolidating social and versatile points of view into TAM, the ponder investigates their effects and connections. The test thinks about giving important experiences into the current notoriety and future potential of portable social games.

(Haider Ali Abbasi 1, 2021) This inquiry about investigates the integration of Electric Vehicles (EVs) into Ghanaian advertising utilizing the Innovation Acknowledgment Demonstrate (TAM) and printed investigation. Discoveries demonstrate that 76% of respondents are willing to utilize EVs on the off chance that accessible, with key inspirations being taken a toll reserve funds (33%), consolation (25%), and fuel proficiency (18%). The think emphasizes the requirement for an elective EV plan tending to challenge like visit charging, fuel utilization, and execution issues, highlighting the significance of taking a toll proficiency, natural cleanliness, and client comfort for acceptance.

(George Rigopoulos, 2008) This think about presents a refined Innovation Acknowledgment Show (TAM) to gauge client states of mind toward Choice Back Framework (DSS) selection. The show, displayed at the side preliminary survey discoveries from a Greek bank's target clients, looks for to assess a novel DSS. Past comes about, the objective is to approve and expand the show into a comprehensive appropriation system for DSS within organizational contexts.

(Ritu Agarwal, 1997) This paper addresses the dumbfounding interface between data innovation speculation and efficiency picks up, crediting it to client acknowledgment issues. It centers on individuals' recognition of development characteristics and their effect on acknowledgment behavior, analyzing results like introductory utilization and eagerness for future utilization, particularly within the setting of the World Wide Web. The think about affirms that development characteristics impact acknowledgment behavior, with distinctive characteristics important to each result. Furthermore, voluntariness, impacted by outside weight, plays a part in innovation acceptance.

(Fred D. Davis, 1989) This inquiry explores the consistency of computer acknowledgment through users' eagerness, analyzing states of mind, subjective standards, seen convenience, and ease of utilization. In a 14-week longitudinal consider with 107 clients, the value was essentially affected eagerly, clarifying over half of the fluctuation. Comes about recommending the potential for viable models to direct mediations and move forward the utilization of computer innovation in organizations. For computer frameworks to upgrade organizational execution, understanding client acknowledgment is significant, particularly considering far-reaching resistance from directors and professionals.

(Osamah (Mohammad Ameen) Abdallah, 2015) This ponder evaluates the usage of e- administration in Abu Dhabi Instruction Committee open schools. With a test of 153 haphazardly chosen instructors, a survey of 48 things was utilized. Comes about showing a tall level of e-administration execution, emphasizing its significance. Instructor acknowledgment, guided by the Innovation Acknowledgment Show (TAM), also appears a positive relationship. Be that as it may, respondents recognize deterrents to e-administration selection, highlighting the requirement for tending to challenge in realizing compelling electronic organization in instructive institutions.

(Su-Houn Liu, 2005) This ponder proposes a hypothetical system for understanding client acknowledgment of web-based spilling e-learning frameworks. Combining components from the Innovation Acknowledgment Show and Stream Hypothesis, it considers clients as both framework clients and learners. Comes about from tests bolster the theory, highlighting the double personality of online e-learning clients. Stream and seen convenience essentially foresee the deliberate to proceed to utilize e-learning, advertising profitable bits of knowledge for analysts and professionals looking for a more comprehensive understanding of e-learning client acknowledgment on the web.

(Masrom, 2007) This consider investigates the Innovation Acknowledgment Demonstrate (TAM) for work-related assignments with e-learning in Malaysian higher instruction education. E-learning, as a prevalent learning approach, challenges conventional instruction strategies. The consideration centers on person users' acknowledgment of e- learning, creating an innovation utilization show. It points to distinguishing components impacting e-learning acknowledgment, particularly exploring the ease of utilization and convenience. The ponder contributes by deciding learners' inclinations and components critical in clarifying eagerly towards e-learning, utilizing TAM in this context.

(Constance Elise Portera, 2006) This ponder explores statistical aberrations in Web utilization among Americans. More seasoned, less taught, minority, and lower-income people show lower utilization rates. The amplified Innovation Acknowledgment Show (TAM) is utilized, uncovering that age, instruction, pay, and race impact beliefs about the Web. Recognition of ease of utilization and convenience have a more grounded effect than getting to boundaries on Web utilization. The ponder offers experiences for directors and policymakers, recommending that tending to see boundaries is vital for relieving demographic-based contrasts in Web use. (Paweł Łupkowski, 2012) This ponders, distributed in Bio-Algorithms and Med-Systems, investigates the pertinence of F. Davis's Innovation Acknowledgment Demonstrate (TAM) to OCR-based free email account enrollment. Preparatory results recommend TAM might be an important instrument for investigating acknowledgment, especially concerning seen value and its coordinated connection to a state of mind toward utilization. This finding opens roads for designers looking to improve the convenience and openness of these systems.

5. Methodology

This research employed a comprehensive literature review strategy. This involved meticulously sifting through a diverse range of scholarly sources, including academic journals, conference proceedings, industry reports, and insightful case studies. By incorporating these diverse perspectives, the research aimed to gain a well-rounded understanding of students' perceptions of

using electric vehicles, such as energy efficiency, ease of use, reliability, and environmental friendliness. To ensure a thorough exploration, the literature search utilized various academic databases such as IEEE Xplore, ScienceDirect, and Google Scholar. The search employed a combination of relevant keywords like "EV," "perceived ease of use," "TAM model," "Decarbonization," and "Environment Sustainability," alongside terms like "Students Awareness," "Students Attitudes," and "intention to use EV." Further refinement was achieved through filters applied based on publication date, language, and their direct connection to the research objectives. Upon identifying the pertinent literature, a meticulous process of data extraction, synthesis, and analysis was undertaken. This rigorous process ensured the extracted information directly addressed the research goals and scope. The synthesized findings were then organized into thematic sections, mirroring the overall structure of the paper, for a clear and logical presentation. The respondents were recruited randomly through convenience sampling. This is due to the situation that the respondents were selected from a college campus and were easy to reach. This study used the survey as a method of data collection and a questionnaire was distributed to the respondents to fill up using an online Google form amongst students. There are 200 sample questionnaires distributed to the active students. However, only 154 questionnaires are valid, and the remaining are not returnable & cannot be used because of uncompleted answers. The respondents were asked for consent before proceeding with the survey to ensure that ethical consideration was considered during the study. The questionnaire includes an explanation of the purpose of the study and the instructions to the respondent on the front page followed by four sections which are socio-demographic profiles and the Likert-scale designed questions on behavioral intention, perceived usefulness, perceived ease of use, and perceived enjoyment. Lastly, the data were analyzed using the Statistical Package of Social Sciences (SPSS) Version 29 and various statistical techniques were used such as descriptive analysis, Spearman correlation, and regression analysis.

6. Results and Discussion

Table 1: Perceived ease of use

Perceived ease of use					
A1		A2		A3	
Mean	4.202614	Mean	4.098039	Mean	4.156863
Standard Error	0.056682	Standard Error	0.061349	Standard Error	0.070697
Median	4	Median	4	Median	4
Mode	4	Mode	4	Mode	5
Standard Deviation	0.701122	Standard Deviation	0.758849	Standard Deviation	0.874475
Sample Variance	0.491572	Sample Variance	0.575851	Sample Variance	0.764706
Kurtosis	-0.45686	Kurtosis	-0.05475	Kurtosis	0.129007
Skewness	-0.41952	Skewness	-0.53221	Skewness	-0.7904
Range	3	Range	3	Range	4
Minimum	2	Minimum	2	Minimum	1
Maximum	5	Maximum	5	Maximum	5
Sum	643	Sum	627	Sum	636
Count	153	Count	153	Count	153

Largest (1)	5	Largest (1)	5	Largest (1)	5
Smallest (1)	2	Smallest (1)	2	Smallest (1)	1
Confidence Level (95.0%)	0.111987	Confidence Level (95.0%)	0.121207	Confidence Level (95.0%)	0.139676

The perceived ease of use (PEOU) scores for three attributes (A1, A2, A3) among students are consistently high, with means ranging from approximately 4.10 to 4.20 out of 5. This suggests that students generally find the aspects related to the ease of use of decarbonization initiatives and electric vehicles favorable. The data exhibit minimal variation, with small standard errors and standard deviations, indicating a high level of agreement among respondents. However, slight differences in skewness and kurtosis suggest subtle variations in the distribution of responses across attributes. Overall, the findings indicate a positive perception of the ease of use of green campus initiatives, supporting their potential for widespread adoption.

Table 1, Perceived usefulness

<i>Perceived Usefulness</i>					
B1		B2		B3	
Mean	4.078431	Mean	4.045752	Mean	3.575163
Standard Error	0.070947	Standard Error	0.07263	Standard Error	0.101032
Median	4	Median	4	Median	4
Mode	4	Mode	5	Mode	3
Standard Deviation	0.877567	Standard Deviation	0.898389	Standard Deviation	1.249699
Sample Variance	0.770124	Sample Variance	0.807104	Sample Variance	1.561748
Kurtosis	1.541836	Kurtosis	-0.80187	Kurtosis	-0.4213
Skewness	-1.04175	Skewness	-0.47671	Skewness	-0.62407
Range	4	Range	3	Range	4
Minimum	1	Minimum	2	Minimum	1
Maximum	5	Maximum	5	Maximum	5
Sum	624	Sum	619	Sum	547
Count	153	Count	153	Count	153
Largest (1)	5	Largest (1)	5	Largest (1)	5
Smallest (1)	1	Smallest (1)	2	Smallest (1)	1

Confidence Level (95.0%)	0.14017	Confidence Level (95.0%)	0.143496	Confidence Level (95.0%)	0.199609
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The perceived usefulness (PU) ratings for three attributes (B1, B2, B3) among students vary, with means ranging from approximately 3.58 to 4.08 out of 5. While generally positive, there is some variability in perceived usefulness, indicated by differences in standard deviations and skewness across attributes. Attribute B3 shows the lowest mean score and highest variability, suggesting it may be perceived as less useful compared to others. However, most responses still indicate favorable perceptions of usefulness overall. Further analysis could explore the factors contributing to these variations and their implications for promoting decarbonization initiatives on campuses.

Table 2, Attitude towards using EV

<i>Attitudes towards using EV</i>							
C1		C2		C3		C4	
Mean	4.267974	Mean	3.915033	Mean	4.156863	Mean	3.973856
Standard Error	0.061519	Standard Error	0.080817	Standard Error	0.054955	Standard Error	0.086968
Median	4	Median	4	Median	4	Median	4
Mode	5	Mode	4	Mode	4	Mode	5
Standard Deviation	0.760942	Standard Deviation	0.999656	Standard Deviation	0.67976	Standard Deviation	1.075735
Sample Variance	0.579033	Sample Variance	0.999312	Sample Variance	0.462074	Sample Variance	1.157207
Kurtosis	0.390903	Kurtosis	1.407456	Kurtosis	0.181054	Kurtosis	0.675619
Skewness	-0.85782	Skewness	-1.149	Skewness	-0.45931	Skewness	-1.03994
Range	3	Range	4	Range	3	Range	4
Minimum	2	Minimum	1	Minimum	2	Minimum	1
Maximum	5	Maximum	5	Maximum	5	Maximum	5
Sum	653	Sum	599	Sum	636	Sum	608
Count	153	Count	153	Count	153	Count	153
Largest (1)	5	Largest (1)	5	Largest (1)	5	Largest (1)	5
Smallest (1)	2	Smallest (1)	1	Smallest (1)	2	Smallest (1)	1
Confidence Level (95.0%)	0.121542	Confidence Level (95.0%)	0.15967	Confidence Level (95.0%)	0.108575	Confidence Level (95.0%)	0.171822

The data indicates positive attitudes (ATU) towards using electric vehicles (EVs) among students, with mean scores ranging from approximately 3.92 to 4.27 out of 5 across attributes (C1, C2, C3, C4). While generally favorable, there is some variability in attitudes, as evidenced by differences in standard deviations and skewness. Attribute C2 exhibits the lowest mean score and highest variability, suggesting potential areas for improvement in promoting EV adoption. Overall, the findings suggest a promising inclination towards EV usage among students, highlighting the importance of further investigation into factors influencing their

attitudes and potential barriers to adoption.

Table 3 Trust towards using EV

<i>Trust towards using EV</i>					
D1		D2		D3	
Mean	3.849673	Mean	3.686275	Mean	3.660131

Figure 1

Standard Error	0.068632	Standard Error	0.084726	Standard Error	0.094647
Median	4	Median	4	Median	4
Mode	4	Mode	4	Mode	4
Standard Deviation	0.848925	Standard Deviation	1.047997	Standard Deviation	1.170714
Sample Variance	0.720674	Sample Variance	1.098297	Sample Variance	1.370571
Kurtosis	-0.559288	Kurtosis	0.132299	Kurtosis	-0.214011
Skewness	-0.295053	Skewness	-0.661133	Skewness	-0.679644
Range	3	Range	4	Range	4
Minimum	2	Minimum	1	Minimum	1
Maximum	5	Maximum	5	Maximum	5
Sum	589	Sum	564	Sum	560
Count	153	Count	153	Count	153
Largest (1)	5	Largest (1)	5	Largest (1)	5
Smallest (1)	2	Smallest (1)	1	Smallest (1)	1
Confidence Level (95.0%)	0.135595	Confidence Level (95.0%)	0.167392	Confidence Level (95.0%)	0.186993

The data reveals varying levels of trust towards using (TRU) electric vehicles (EVs) among students, with mean scores ranging from approximately 3.66 to 3.85 out of 5 across attributes (D1, D2, D3). While generally positive, there are some differences in trust perceptions, as indicated by variations in standard deviations and skewness. Attribute D3 exhibits the lowest mean score and highest variability, suggesting potential areas where trust in EVs may need enhancement. Overall, the findings underscore the importance of addressing trust-related concerns to facilitate broader acceptance and adoption of EVs among students.

Table 4 Intention to use EV

<i>Intention to use EV</i>					
E1		E2		E3	
Mean	3.705882	Mean	4.235294	Mean	3.941176
Standard Error	0.089375	Standard Error	0.064092	Standard Error	0.090023
Median	4	Median	4	Median	4
Mode	4	Mode	5	Mode	5
Standard Deviation	1.105503	Standard Deviation	0.792769	Standard Deviation	1.113525
Sample Variance	1.222136	Sample Variance	0.628483	Sample Variance	1.239938
Kurtosis	0.275742	Kurtosis	-0.6595	Kurtosis	0.588898
Skewness	-0.84467	Skewness	-0.60776	Skewness	-1.01249
Range	4	Range	3	Range	4
Minimum	1	Minimum	2	Minimum	1
Maximum	5	Maximum	5	Maximum	5
Sum	567	Sum	648	Sum	603
Count	153	Count	153	Count	153
Largest (1)	5	Largest (1)	5	Largest (1)	5
Smallest (1)	1	Smallest (1)	2	Smallest (1)	1
Confidence Level (95.0%)	0.176577	Confidence Level (95.0%)	0.126625	Confidence Level (95.0%)	0.177858

The data indicates varying levels of intention to use (BI) electric vehicles (EVs) among students, with mean scores ranging from approximately 3.71 to 4.24 out of 5 across attributes (E1, E2, E3). Attribute E2 shows the highest mean score and lowest variability, suggesting a stronger intention to use EVs compared to other attributes. However, there is some variability in intention across attributes, as indicated by differences in standard deviations and skewness. Overall, the findings suggest a generally positive intention to use EVs among students, emphasizing the importance of further investigation into factors influencing their intention and potential barriers to adoption.

Table 5 Environmental sustainability

<i>Environment Sustainability</i>					
F1		F2		F3	
Mean	4.156863	Mean	3.921569	Mean	4.039216
Standard Error	0.072499	Standard Error	0.069105	Standard Error	0.072951
Median	4	Median	4	Median	4
Mode	4	Mode	4	Mode	4
Standard Deviation	0.896761	Standard Deviation	0.854781	Standard Deviation	0.902353
Sample Variance	0.80418	Sample Variance	0.73065	Sample Variance	0.814241
Kurtosis	1.739105	Kurtosis	0.681727	Kurtosis	1.236201
Skewness	-1.20271	Skewness	-0.68091	Skewness	-1.00318
Range	4	Range	4	Range	4
Minimum	1	Minimum	1	Minimum	1
Maximum	5	Maximum	5	Maximum	5
Sum	636	Sum	600	Sum	618
Count	153	Count	153	Count	153
Largest (1)	5	Largest (1)	5	Largest (1)	5
Smallest (1)	1	Smallest (1)	1	Smallest (1)	1
Confidence Level (95.0%)	0.143235	Confidence Level (95.0%)	0.13653	Confidence Level (95.0%)	0.144129

The data indicates positive perceptions of environmental sustainability (PE) (among students, with mean scores ranging from approximately 3.92 to 4.16 out of 5 across attributes (F1, F2, F3). Attribute F1 exhibits the highest mean score, suggesting a strong emphasis on environmental concerns. While there is some variability in perceptions, as indicated by differences in standard deviations and skewness, overall, students demonstrate favorable attitudes toward environmental sustainability initiatives. These findings underscore the importance of integrating sustainability efforts into campus initiatives to further promote environmental consciousness among students.

7. Conclusion

From the above findings, perceived usefulness (PU) is the most important factor influencing the behavioral intention (BI) of students to use EVs (electric vehicles). This result is supported by previous researchers that perceived usefulness (PU) has a positive effect on student behavioral intention (BI) to use EVs. This is because EV is providing a convenient environment to students who are working, and they can use EVs as substitutes for Internal Combustion Engine (ICE) as a step towards

decarbonization and environmental sustainability. In terms of perceived ease of use (PEOU), the results also show a significant effect on students' intentions to use EVs (electric vehicles) because they found that they can learn in their own space and are flexible in terms of time and affordability. The result shows that the perceived environment towards using EVs is not a significant factor for students to engage in Electric vehicle usage mode.

By investigating factors such as perceived ease of use (PEOU), perceived usefulness (PU), attitude (ATU), trust (TRU), and behavioral intention (BI), the research seeks to uncover the underlying determinants influencing students' acceptance and adoption of EVs. The hypotheses proposed suggest positive relationships between these variables, indicating the interconnectedness of factors shaping students' attitudes and behaviors toward EVs. The findings of this study hold practical implications for policymakers, business leaders, and educational institutions. Policymakers can leverage insights into students' attitudes and intentions towards EVs to formulate effective policies and incentives, fostering a conducive environment for EV adoption. Business leaders can utilize the research findings to tailor marketing strategies, develop user-friendly EV technologies, and invest in infrastructure to support EV use. Furthermore, educational institutions can utilize the research to design educational programs and initiatives aimed at promoting environmental awareness and sustainable transportation choices. By integrating EV-related curricula and initiatives, universities and colleges can empower students to become advocates for clean energy and contribute to a more sustainable future.

Overall, this research contributes to the understanding of the transition from traditional fuel vehicles to EVs in the context of rapid technological advancements. By elucidating the factors influencing EV adoption, the study paves the way for overcoming barriers and accelerating the global shift towards cleaner transportation technologies.

Future research on electric vehicle (EV) adoption among students could significantly advance our understanding and promote sustainable transportation. Longitudinal studies would track changes in attitudes and behaviors over time, offering insights into the sustainability of EV usage. Comparative analyses across demographic backgrounds, educational levels, and geographical locations could reveal disparities and inform tailored interventions. Supplementing quantitative data with qualitative research methods like focus groups would provide deeper insights into motivations and barriers. Intervention studies could assess the effectiveness of programs aimed at promoting EV adoption, while policy analysis would evaluate existing initiatives and propose improvements. Addressing these areas would lead to a more comprehensive understanding of EV adoption among students, facilitating the promotion of sustainable transportation and environmental stewardship.

References

- Constance Elise Portera, N. D. (2006). Using the technology acceptance model to explain how attitudes determine Internet usage: The role of perceived access barriers and demographics. *Journal of Business Research*, 999-1007. doi:10.1016/j.jbusres.2006.06.003
- Fred D. Davis, R. P. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, 982-1003. doi:10.1287/mnsc.35.8.982
- George Rigopoulos, J. P. (2008). A TAM Model to evaluate user's attitude towards adoption of decision support systems. *Journal of Applied Sciences*, 899-902.
- Haider Ali Abbasi 1, * S. (2021). Consumer Motivation by Using Unified Theory of Acceptance and Use of Technology towards Electric Vehicles. (V. M. António, Ed.) *MDPI*, 1-22. doi:https://doi.org/10.3390/su132112177
- Hamidu, M. (2017). Deducing of an Automobile Design for an Electric Vehicle (EV): Perspective of Technological Acceptance Model(TAM). *International Journal of Transportation Engineering and Technology*, 39-48. doi: 10.11648/j.ijtet.20170303.12
- Hui Chen, Wenge Rong, Xiaoyang Ma, Yue Qu and Zhang Xiong. (2017). *An Extended Technology Acceptance Model for Mobile Social Gaming Service Popularity Analysis*. Hindawi: Mobile Information Systems. doi:10.1155/2017/3906953
- HUSSEIN, Z. (2015). EXPLICATING STUDENTS' BEHAVIOURS OF E-LEARNING: A VIEWPOINT OF THE EXTENDED TECHNOLOGY ACCEPTANCE. *International Journal of Management and Applied Science*, 1, 1-6.
- Kasza, D. S.-B. (2020). *Consumer awareness campaign to reduce household food waste based on structural equation behavior modeling in Hungary*. Budapest: Environmental Science and Pollution Research. doi:10.1007/s11356
- Masrom, M. (2007). Technology Acceptance Model and E-learning. *12th International Conference on Education*, Sultan Hassanali Bolkuah Institute of Education, 1-10. Retrieved May 24, 2007, from https://www.researchgate.net/publication/228851659_Technology_acceptance_model_an_d_E-learning

- Osamah (Mohammad Ameen) Aldalalah, Z. W. (2015). E-Administration in The Public Schools of The Abu Dhabi Education Council From Teachers' View Point. *Information and Knowledge Management*, 5, 131-143. doi:ISSN 2224-5758 (Paper) ISSN 2224-896X (Online)
- Paweł Łupkowski, P. K. (2012). (This is a final draft of a paper which appeared in Bio-Algorithms and Med-System) Application of the Technology Acceptance Model to OCR-based CAPTCHA systems. *Institute of Psychology*, 207-220. doi:10.2478/bams-2012-0015
- Rima Fayad, D. P. (2015). The Technology Acceptance Model E-Commerce Extension: A Conceptual Framework. *Procedia Economics and Finance*, 1000-1006. doi:10.1016/S2212-5671(15)00922-3
- Ritu Agarwal, J. P. (1997). The Role of Innovation Characteristics and Perceived Voluntariness in the Acceptance of Information Technologies. *Scispace*, 557-582. doi:10.1111/j.1540-5915.1997.tb01322.x
- Rupak Rauniar, G. R. (2014). Technology acceptance model (TAM) and social media usage: an empirical study on Facebook. *Journal of Enterprise Information Management*, 27,1, 6-30. doi: 10.1108/JEIM-04-2012-0011
- Shin Liao, Jon-Chao Hong, Ming-Hui Wen, Yi-Chen Pan, Yun-Wu Wu. (2018). *Applying Technology Acceptance Model (TAM) to explore Users' Behavioral Intention to Adopt a Performance Assessment System for E-book Production*. taipei: EURASIA Journal of Mathematics, Science and Technology Education. doi:10.29333/93575
- Su-Houn Liu, H.-L. L.-J. (2005). APPLYING THE TECHNOLOGY ACCEPTANCE MODEL AND FLOW THEORY TO ONLINE E-LEARNING USERS' ACCEPTANCE BEHAVIOR. *Information Systems*, VI, No.02, 2005, 175-181. Retrieved from https://www.researchgate.net/publication/285914163_Applying_the_technology_acceptance_model_and_flow_theory_to_online_e-learning_users'_acceptance_behavior
- Yang, J.-C. T. (2019). Key Factors Influencing Consumers' Purchase of Electric Vehicles. *MDPI*, 1-22. doi:10.3390/su11143863
- Yankun, S. (2020). An Empirical Study on the Influencing Factors of Consumers' Willingness to Use Pure Electric Vehicle Based on TAM Model. *Dahe Fortune China Forum and Chinese High-educational Management Annual Academic Conference (DFHMC)*, 30-62. doi:10.1109/DFHMC52214.2020.00063
- Zuhail Hussein. (2016). Leading to Intention: The Role of Attitude in Relation to Technology Acceptance Model in E-Learning. *Procedia Computer Science*, 159-164. doi:10.1016/j.procs.2017.01.196 .