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RESEARCH ARTICLE

Factors Influencing the Acceptance of Electric Vehicles in Malaysia: Extended Technology Acceptance Model Analysis

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ABSTRACT

Understanding the factors that impact the acceptability of electric vehicles (EVs) is becoming important as the global automotive industry moves toward sustainable transportation solutions, particularly in emerging economies like Malaysia. However, obstacles such as high initial costs and limited charging infrastructure impede the widespread adoption of electric vehicles (EVs) in Malaysia. For this reason, we conducted a survey to a sample of Malaysian respondents to examine the acceptance of electric vehicles in Malaysia using Technology Acceptance Model (TAM). We obtained a total of 114 valid respondents through questionnaires, and the results show that each of the hypotheses was supported. Overall, the contribution of a study on the factors influencing the acceptance of electric vehicles in Malaysia lies in its potential to inform policy, drive market development, promote sustainability and facilitate the transition towards a cleaner and more sustainable transportation system.

INTRODUCTION

The adoption of electric vehicles (EVs) is an important step towards sustainable mobility, providing the ability to alleviate environmental damage and reduce dependence on fossil fuels. However,

despite their advantages, electric vehicles continue to encounter barriers in gaining widespread acceptance, particularly in countries such as Malaysia. There are a few reasons why Malaysians are unwilling to adopt electric vehicles. Firstly, the limited infrastructure. The lack of charging stations and infrastructure for electric vehicles in Malaysia might discourage potential buyers from considering electric vehicles as a viable option. It is a critical part of a future transportation system that supports electric vehicles is an abundance of facilities with which people can charge as they park at home. In addition to that, electric vehicles also remain a high upfront cost in development (Dixon et al., 2020). According to Sanguesa et al. (2021), batteries are the main obstacle to the wider adoption of EV, their cost is expensive and the charging time of the battery is slow even using a fast charge, and it may also require 1 to 3 hours for a vehicle. Egbue and Long (2012) stated that range anxiety is the main reason consumers did not want to adopt an EV. Consumers would be willing to pay an amount within 66 and 75 US dollars, which are RM314 and RM357, to increase the driving range per kilometer (Dimitropoulos et al., 2013). Policymakers, industry stakeholders, and appropriate authorities can encourage wider EV use and accelerate the transition to a greener transportation landscape by investing in infrastructure development, addressing cost concerns, and upgrading battery technology. Based on the previous statement, in this study we used the Technology Acceptance Model (TAM) and created a set of questionnaires to find out the willingness of consumers in Malaysia to use electric vehicles and the impact of the public's desire to adopt electric vehicles (Mohammed et al., 2023a; Mohammed et al., 2023b). Finally, this study will help to provide a new perspective on the future development of EV in Malaysia.

1.1 Problem Statement

Barriers hindering the widespread adoption of electric vehicles (EVs) in Malaysia.

1.2 Contribution

Overall, the contribution of a study on the factors influencing the acceptance of electric vehicles in Malaysia lies in its potential to inform policy, drive market development, promote sustainability and facilitate the transition towards a cleaner and more sustainable transportation system.

2.0 LITERATURE REVIEW

Environmental consciousness in influencing the acceptance of electric vehicles in Malaysia

Vehicles with electric motors that run mostly on electricity are known as electric cars or EVs. In contrast to conventional internal combustion engine vehicles that run on gasoline or diesel, electric vehicles store and supply electricity to their motors via rechargeable batteries. The first EV car was produced in 2000, which is the Toyota Prius. The factor for developing electric vehicles is that electric vehicles can alleviate CO_2 and pollutant emissions, even when considering the secondary emissions from electricity generation and battery production. CO_2 mitigation expenses are expected to decrease in the future through technological learning and an increasing proportion of renewables in the electricity mix (Weiss et al., 2019). Different governments around the world have already started efforts to reduce CO_2 emissions. In addition to this, electric vehicles act not only as a transportation device but also as storage capacity since some energy sources such as wind turbines cannot be stored and sometimes the offer is larger than demand (Buekers et al., 2014). Based on these environmental problems, the rate of adoption of electric vehicles could be a decisive factor in determining whether the world achieves its target of reducing CO_2 (Adnan et al., 2018). In conclusion, electric vehicles are essential in reducing CO_2 emissions and pollution in transportation.

Perception of ease of use in influencing the acceptance of electric vehicles in Malaysia

According to a study by Ozaki and Sevastyanova (2011), performance factors such as comfort, enjoyment, and ease of driving were identified as crucial considerations influencing consumers' decisions to adopt electric vehicles. Dixon et al. (2020) found that electric vehicle drivers with home

charging stations enjoy higher levels of convenience compared to internal combustion engine vehicles drivers. Another study indicates that the improvement of driving range is also a significant consideration (Cecere et al., 2018).The previous study has shown that many consumers consider the performance of electric vehicles before making a decision to purchase.

Perceived usefulness factors in influencing the acceptance of electric vehicles in Malaysia

Based on the study, a higher perceived usefulness will increase the consumer's willingness to adopt an electric vehicle (Wang and Dong, 2016). Vafaei-Zadeh et al. (2022) summarizes multiple studies that utilize the Technology acceptance model (TAM) to justify how perceived usefulness can affect the behavioral intention of people. The idea of perceived usefulness (PU) about how consumers observed environmentally friendly products would improve the user's life quality, thus influencing their intention (Vafaei-Zadeh et al., 2022; Nasir et al., 2024).

Perception of policy in influencing the acceptance of electric vehicles in Malaysia

Based on a finding, consumers are hesitant to spend a significant amount extra when buying electric vehicles. They prefer the price to be more reasonable and for the ongoing cost to be low, other than that they will appreciate it when the government provides substantial incentives (Gong et al., 2020; Jam et al., 2010). Furthermore, to reduce the upfront cost and increase consumer interest in EVs, various financial incentives, such as direct purchase subsidies and preferential tax policies, have been introduced.However, this study has investigated the impact of these financial incentives on EV adoption and sales, revealing that their influence on consumer intent to adopt EVs has no significant effect (Wang et al.,2018). In this study, it provides evidence that shows that government policy incentives such as subsidies were not as powerful as some electric vehicle performance attributes for changing the intention of individuals to adopt and it is important for policy makers to know that promoting electric vehicles cannot just rely on innovative policy, but improving performance of electric vehicles is also necessary (Li et al., 2018). In addition to performance, promotion of electric vehicles should also combine the effects of environmental concern and policy measures, since environmental concern strengthens the effects of financial incentive policy measures and convenience policy measures (Wang et al., 2017). In essence, consumers prioritize affordability and low operating costs for electric vehicles, with government incentives playing a positive role, although vehicle performance remains crucial. A comprehensive strategy that integrates environmental concerns and convenience measures is essential for effective promotion of electric vehicles.

Subjective norm in influencing the acceptance of electric vehicles in Malaysia

Daziano and Chiew (2012) found that social network effects will play a large role in determining the choice of either a household or an individual in adopting an electric vehicle. Eppstein et al. (2011) suggested that social influence is one of the important factors that impact the choice of individuals to purchase electric vehicles. To guide consumers in adopting an electric vehicle, it can be achieved by fostering and establishing a social culture that can also promote the implementation of suitable government policies (Li et al., 2017). In conclusion, it is necessary to call attention to relevant norms and efficacy beliefs in the context of electric vehicle adoption because ignoring the importance of social norms and collective efficacy will affect the aim of increasing the acceptance of electric vehicles (Barth et al., 2016).

Attitude to influence the acceptance of electric vehicles in Malaysia

The research by Jing et al. (2019) compiled information from multiple studies and came to the conclusion that an individuals' knowledge of an individual about a product plays a very important role in influencing their attitudes and intentions to choose and use a product. It was also discovered that knowing more about AV technology, such as the performance elements of AVs and the advantages of AVs makes it more likely that people will use AVs with a positive attitude and intention.

Wang, S. et al. (2018) expanded on the Technology Acceptance Model (TAM) model to explore the effects of consumer knowledge regarding EVs and how it influences their attitude towards accepting electric vehicles. Documentation highlighted how customers' knowledge about electric vehicles can have a positive impact on their attitude, intention to adopt electric vehicles and perceived usefulness of electric vehicles but had a negative influence on perceived risk of using electric vehicles. Han et al. (2017) questioned the intention for the adoption of EVs from the perception of value, functional and non-functional, of its use. The outcome shows the direct and indirect effects that functional values had on buyers' intentions to embrace electric vehicles. On the other hand, attitude ruled the non-functional value, which had only a marginal impact on the adoption of EVs.

Purchase Intention in influencing the acceptance of electric vehicles in Malaysia

Abbasi et al. (2021) conducted a study exploring various factors influencing customer purchase behavior, including social, environmental, financial, performance, demographic, infrastructure readiness, and government intervention. Several factors that can enhance customer purchase behavior were discussed, such as effort expectancy, performance expectancy, government incentives, societal influence, environmental concern, perceived enjoyment, new technology, and fuel efficiency.

In another study, Asadi et al. (2021) investigated the impact of perceived usefulness, attitude, subjective norms, perceived behavioral control, price value, perceived risk, environmental self-image, and infrastructure barriers on people's intention to purchase electric vehicles. They expanded the model by adding essential variables to measure the factors affecting electric vehicle purchase intentions: price value (PV), perceived risk (PR), environmental self-image (ESI), and infrastructure barrier (IB) factors.

The literature review is summarized in Table 1 to show an overview of previous studies.

Table 1. Covariate of acceptance of electric vehicles in previous studies

Covariate	Detail variables	Previous Study
Environmental Consciousness (EC)	Electric cars mitigate CO2 and pollutant emissions. Electric car stimulus to introduce more green or less carbon-intensive energy sources. The reduction of carbon dioxide emission being kept in view, the PHEV has been considered as the best alternative.	Weiss et al., 2019 Buekers et al., 2014 Adnan et al., 2018
Perceived Ease of Use (PEU)	The value of comfort, pleasure and ease of driving are important factors. Home charging facilities will be the factors of considering electric vehicles. Performance such as driving range will be the factor to increase consumer purchase intention	Ozaki and Sevastyanova, 2011 Dixon et al., 2020 Cecere et al., 2018
Perceived Usefulness (PU)	Higher perceived usefulness increases consumer intention in adopting electric vehicles.	Wang and Dong, 2016 Vafaei-Zadeh et al., 2022

Policy Perception (PP)	Government provides additional incentives. Current financial incentive policy has no significant effect on adoption intention Policy incentives were not as powerful as EV performance attributes to alter individual intention to adopt Environmental concern strengthens the effects of financial incentive policy measures and convenience policy measures	Gong et al., 2020 Wang et al., 2018 Li et al., 2018 Wang et al.,2017
Subjective Norm (SN)	Social network effects will affect the intention of individuals to purchase electric vehicles. Social influence could impact individual choice. A Focused way to guide consumers adopting electric vehicles can be achieved through fostering and establishing a social culture. Ignoring the importance of social norms and collective efficacy will affect the aim at increasing the acceptance of electric vehicles	Daziano and Chiew, 2012 Eppstein et al., 2011 Li et al., 2017 Barth et al., 2016
Attitude (AT)	Knowledge of a product plays a role in influencing publics' attitude towards electric vehicles.	Jing et al., 2019 Wang et al., 2018 Han et al., 2017
Purchase Intention (PI)	Variables for measuring factors affecting electric vehicle purchase intention: price value (PV), perceived risk (PR), environmental self-image (ESI), and infrastructure barrier (IB) factors.	Abbasi et al., 2021 Asadi et al., 2021

Conceptual framework

A conceptual framework (Figure 1) is developed based on the literature review to test the following hypotheses:

H1: Perceived ease of use positively affects perceived usefulness.

H2: Perceived usefulness positively affects attitudes.

H3: Perceived ease of use will positively affect attitudes.

H4: Perceived usefulness will positively impact the purchase intention.

H5: Attitudes positively affect purchase intention.

H6: Environmental consciousness positively affects attitudes.

H7: Policy perception positively affects attitudes.

H8: Subjective norms positively affect the purchase intention.

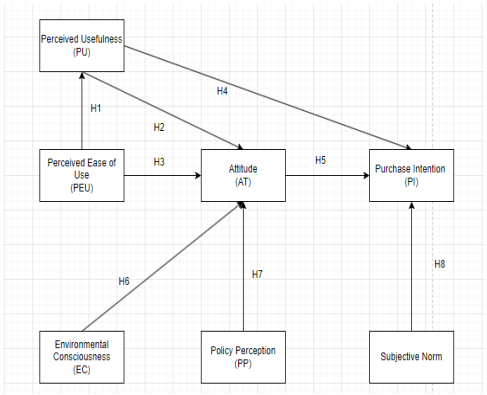

Figure 1. Conceptual framework developed for this recent research study based on the review of the literature.

3.0 RESEARCH METHODOLOGY

In this section, the research design, data collection methods, measurement, and sampling techniques that were applied to this study will be discussed. The main reason for the selected population is Malaysia's opinion about adoption of electric vehicles in Malaysia. A survey form is created to collect data and share in "Xiao Hong Shu".

3.1 Research Design

We chose a survey research design to efficiently collect data from multiple demographics of respondents in a short period of time. To find the relationship between the mentioned factors that influence the acceptance of adoption in electric vehicles, a structured questionnaire proved to be a suitable choice. The questionnaire was designed and separated into seven different sections, each measuring different variables that we wanted to identify their relationship with influencing acceptance to adoption in electric vehicles for our study (Ting et al, 2024; Ahmad et al., 2024). The definitions for each section measure are: 1. *Perceived Usefulness*: This section is to be used to measure the usefulness of electric vehicles based on the respondents; 2. *Perceived ease of Use*: The respondents' opinions about the ease of using electric vehicles will be explored. The perceived ease of use is a significant factor that affects the influence of acceptance in the use of electric vehicles; 3. *Environmental Consciousness*: This section aims to find out if electric vehicles will have a good effect to the environment; 4. *Subjective Norm:* This section is to find out what social pressure will affect respondents in adopting electric vehicles; 5. *Policy Perception:* Investigating the impact of transportation policies will increase the intention of respondents in adopting electric vehicles; 6. *Attitude:* This section is to examine the public evaluation of electric vehicles based on respondents; and 7. *Purchase Intention:*This section will find out the purchase intentions of respondents in acceptance of electric vehicles.

3.2 Data collection

To collect data efficiently, we use a popular online survey method, "Google Forms". This is an online platform that allows for easy distribution, real-time data capture, and convenience for respondents where the questionnaire is accessible through any computer or mobile device. We share it on the 'XiaoHongShu' platform to gather the responses. Importantly, we ensured that respondents had the right to reject filling out the questionnaire at any point, which is important to respect their decision. To protect the privacy of the respondents, we do not asking for any personal details.

3.3 Measurement instruments

The measurements we used to capture the responses of the respondents are shown in Table 2, together with the questionnaire items adapted from Yang and Wen (2023).

Table 2: Questionnaire elements adapted from Yang and Wen (2023)

Variables	Items	Measurements Scale
Demographic	Age Gender	Ordinal Nominal
Perceived Usefulness	Electric cars would work well for my mobility needs. Electric vehicles can effectively solve traffic congestion problems. Electric car would be an excellent way to improve my driving behavior (e.g., overtaking, stopping, etc.). Electric cars would improve my quality of life	5 scale point
Perceived ease of use	Using an electric vehicle should be more straightforward than other types of motorized vehicles. Using electric vehicle amenities is easy for me (e.g., parking, charging). Electric cars are easy to repair and maintain	5 scale point
Environmental Consciousness	I would be worried about air pollution from vehicle emissions. I think the impact on the natural environment should be considered when buying a car. I have a responsibility to adopt a low carbon mode of transportation.	5 scale point
Subjective Norm	I should be surrounded by people who think that using an electric car is a good choice. I will use an electric car if everyone around me uses it too. Mass media promotion of electric vehicles will increase my willingness to use electric vehicles.	5 scale point
Policy Perception	Electric vehicles should receive policy support from government departments. There should be incentives for purchasing and using electric vehicles in the future. The future mobility environment (mainly road facilities, social support, government policies, etc.) should be sufficient to support the use of electric cars.	5 scale point
Attitude	I think an electric car is a good design. I think electric cars can be trusted. In the future of electric cars instead of traditional vehicles, I would support electric cars.	5 scale point
Purchase Intention	When electric cars are put on the market I want to use an electric car. I would consider buying an electric car. I would recommend that my friends and relatives buy and use an electric car.	5 scale point

3.4 Sampling

To allow us to reach out to many different demographic groups of respondents without targeting a specific population, we applied convenience sampling. Since our goal was to explore factors influencing the acceptance of adopting electric vehicles, we aim to have more respondents to increase the accuracy of our findings and analysis, so our target is 200 responses. However, we had only received a total of 114 responses, which is quite lower than our expectations. Although the sample size is smaller than our target, it still provides valuable information for our study.

3.5 Data Analysis

The data collected from 114 respondents will go through different analyzes to find facts to support our hypothesis. Perceived ease of use, perceived usefulness, environmental consciousness, subjective

norm, policy perception, attitude, and the purchase intention of electric vehicles will be analyzed using multiple regression analysis to test their direction and relationship, which will then be used to test our hypothesis. These analysis methods are chosen based on the context of our hypotheses to properly test them. Our research methodology is designed to align with our research objectives, which are to examine the factors that influence user acceptance in adopting electric vehicles. Through the research design, data collection, measurement, sampling, and data analysis methods we chose, we seek to identify valuable information for the study of influencing acceptance to adoption in electric vehicles.

4.0 RESULTS AND DISCUSSIONS

Based on Table 3, the test is carried out by 114 Malaysian respondents, the result of the reliability test ranges from poor to acceptable (0.5 - 0.8). Although it is low in each variable, the overall reliability level of questionnaire items is 0.88 which is good.

Table 3: Reliability level of questionnaire items

No.	Variables	No. of Items	Cronbach's Alpha
1	Perceived Usefulness	4	.72
2	Perceived Ease of Use	3	.57
3	Environmental Consciousness	3	.61
4	Subjective Norm	3	.69
5	Policy Perception	3	.65
6	Attitude	3	.72
7	Purchase Intention	3	.66
	Overall	22	.88

4.1 Demographic

Based on Table 4, we collected a total of 114 Malaysian respondents. There are a total of 18 males, which is 15.8% and 96 females, which is 84.2% from the total respondents. Among these respondents, there are a total of 98 respondents with a majority in the age group of 15-24 (86.0%). 11 of the respondents are from the age group of 25-30 (9.6%) and the least, which is only 5 is from the age group of 31-40 (4.4%).

Table 4: Descriptive statistics

Individual-level variables	N	Percent
Gender		
Male	18	15.8
Female	96	84.2
Age		
15-24	98	86.0
25-30	11	9.6
31-40	5	4.4

4.2 Hypotheses

Table 5 shows that all hypotheses are accepted based on the result. Perceived ease of use positively affects perceived usefulness (R H1 = .566, sig H1 = .000); Perceived usefulness positively affects attitudes (R H2 = .540, sig H2 = .000); Perceived ease of use will positively affect attitudes (R H3 = .496, sig H3 = .000); Perceived usefulness will positively impact the purchase intention (R H4 = .369, sig H4 = .000); Attitudes positively affect purchase intention (R H5 = .566, sig H5 = .000); Environmental consciousness positively affects attitudes (R H6 = .258, sig H6 = .006); Policy perception positively affects attitudes(R H7 = .313, sig H7 = .001); Subjective norms positively affect the purchase intention (R H8 = .591, sig H8 = .000).

Table 5: Pearson Correlation

	Perceived_ Usefulness	Perceived_ Ease Of Use	Environmental Consciousness	Subjective Norm	Policy Perception	Attitude
Perceived_Ease Of Use	.556***					
Environmental_Counsciousness	.319***	.312***				
Subjective-Norm	.388***	.551***	.390***			
Policy_Perception	.100	.119	.416***	.203*		
Attitude	.540***	.496***	.258**	.363***	.313***	
Purchase_Intention	.369***	.483***	.256**	.591***	.355***	.566***

Note: *p<0.05; **p<0.01; ***p<0.001

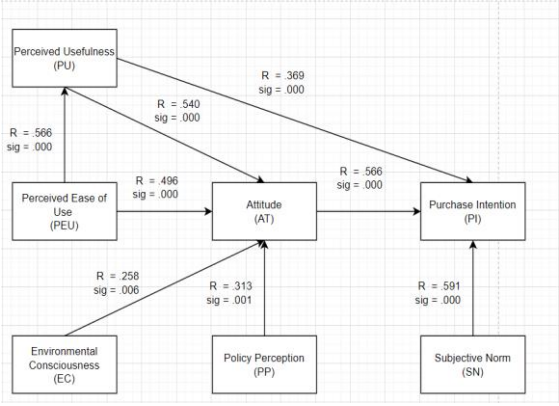

Figure 2. Diagram to show the relation between hypotheses

4.3 DISCUSSION

Based on research done by Adnan et al., 2018, it is stated that environmental awareness is positively affected by attitudes. Compared to their research, the result in our study is consistent, it shows that H6 is accepted. Meanwhile, if the public perceives electric vehicles (EVs) as more useful and easier to use than other vehicles, they are likely to develop a positive attitude toward them and be more inclined to adopt them. Examples of this include achieving the performance of electric vehicles, improving their range of operation, and being more affordable. It is consistent with (Cecere et al., 2018) based on the result.

On the other hand, positive policy perception will increase the consumer's attitude towards electric vehicles. This statement is consistent with (Egbue and Long, 2012) which say that policy makers can influence the public appreciation through social media for non-financial benefits of adopting EV such as energy security. Furthermore, consumers will pay more attention to other opinions in purchasing EVs. Barth et al. (2016) stated that social norms will positively influence the consumer's purchase intention, which is consistent with our result.

5.0 CONCLUSION

Based on the technology acceptance model, this study uses prospective electric vehicle users as its research subject. It combines the technical aspects of these vehicles with public awareness of the environment, subjective norms, and policy influences to assess residents' inclination to utilize them. The study's findings demonstrate that all the variables significantly increase consumers' propensity to purchase. The use of electric vehicles has great development potential, wide market possibilities, and is consistent with national circumstances. The following pertinent recommendations can be

obtained from the study presented in this report for appropriate government policy-making departments:

First, people need to be made more aware of the detrimental effects of conventional fuel vehicles. Not only that, governments and electric vehicle manufacturers can collaborate to create a campaign or seminar to raise awareness of the benefit of electric vehicles. They can also take the initiative to help reduce these issues. Second, to encourage dependent consumption, relevant automakers should create effective marketing plans. According to studies, subjective standards support consumers' propensity to purchase and utilize automobiles. As a result, businesses should target users with prior automotive experience and tailor their product designs to suit their specific demands. Third, the government should improve the construction of the infrastructure provided. Since attitudes towards using electric vehicles will be significantly impacted by perceived utility and simplicity of use, it is imperative to enhance the associated building infrastructure, such as a network for charging stations and protecting rights of way, while increasing awareness of and promotion for electric cars.

Our study has two limitations: There were only 114 respondents in total and convenience sampling results did not allow a generalization of the interconnection between perceived utility, perceived risk, perceived ease of use, perceived cost, and population awareness of the intention to adopt electric vehicles. Not only that, but our respondents are mostly high school students, which affects the accuracy of our results for the whole population, where working people and older age should be considered. In our study, future studies should focus on the relationship between different age groups of Malaysia in terms of the adoption of electric vehicles. Find out whether teenagers and people of a higher age will have different opinions on adopting electric vehicles.

6.0 REFERENCES

Abbasi, H. A., Shaari, Z. H., & Moughal, W. (2021). Consumer Motivation to Enhance Purchase Intention Towards Electric Vehicles in Malaysia. In SHS Web of Conferences (Vol. 124, p. 09003). EDP Sciences. https://doi.org/10.1051/shsconf/202112409003

Adnan, N., Nordin, S. M., Amini, M. H., & Langove, N. (2018). What make consumer sign up to PHEVs? Predicting Malaysian consumer behavior in adoption of PHEVs. Transportation Research Part A: Policy and Practice, 113, 259–278. https://doi.org/10.1016/j.tra.2018.04.007

Ahmad, M., Ali, A., Tin, T. T., & Ali, A. (2024). Harnessing the Power of Geospatial Data: The Convergence of SDI, Big Data, and Cloud Computing. In Emerging Trends in Cloud Computing Analytics, Scalability, and Service Models (pp. 312-330). IGI Global. https://doi.org/10.4018/979-8-3693-0900-1.ch016

Asadi, S., Nilashi, M., Samad, S., Abdullah, R., Mahmoud, M., Alkinani, M. H., & Yadegaridehkordi, E. (2021). Factors impacting consumers' intention toward adoption of electric vehicles in Malaysia. Journal of Cleaner Production, 282, 124474. https://doi.org/10.1016/j.jclepro.2020.124474

Barth, M., Jugert, P., & Fritsche, I. (2016). Still underdetected – Social norms and collective efficacy predict the acceptance of electric vehicles in Germany. Transportation Research. Part F, Traffic Psychology and Behaviour, 37, 64–77. https://doi.org/10.1016/j.trf.2015.11.011

Buekers, J., Van Holderbeke, M., Bierkens, J., & Panis, L. I. (2014). Health and environmental benefits related to electric vehicle introduction in EU countries. Transportation Research Part D: Transport and Environment, 33, 26–38. https://doi.org/10.1016/j.trd.2014.09.002

Cecere, G., Corrocher, N., & Guerzoni, M. (2018). Price or performance? A probabilistic choice analysis of the intention to buy electric vehicles in European countries. Energy Policy, 118, 19–32. https://doi.org/10.1016/j.enpol.2018.03.034

Daziano, R. A., & Chiew, E. (2012). Electric vehicles rising from the dead: Data needs for forecasting consumer response toward sustainable energy sources in personal transportation. Energy Policy, 51, 876–894. https://doi.org/10.1016/j.enpol.2012.09.040

Dimitropoulos, A., Rietveld, P., & Van Ommeren, J. (2013). Consumer valuation of changes in driving range: A meta-analysis. Transportation Research. Part a, Policy and Practice, 55, 27–45. https://doi.org/10.1016/j.tra.2013.08.001

Dixon, J., Andersen, P. B., Bell, K., & Træholt, C. (2020). On the ease of being green: An investigation of the inconvenience of electric vehicle charging. Applied Energy, 258, 114090. https://doi.org/10.1016/j.apenergy.2019.114090

Egbue, O., & Long, S. (2012). Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions. Energy Policy, 48, 717–729. https://doi.org/10.1016/j.enpol.2012.06.009

Eppstein, M. J., Grover, D., Marshall, J. S., & Rizzo, D. M. (2011). An agent-based model to study market penetration of plug-in hybrid electric vehicles. Energy Policy, 39(6), 3789–3802. https://doi.org/10.1016/j.enpol.2011.04.007

Gong, S., Ardeshiri, A., & Rashidi, T. H. (2020). Impact of government incentives on the market penetration of electric vehicles in Australia. Transportation Research Part D: Transport and Environment, 83, 102353. https://doi.org/10.1016/j.trd.2020.102353

Han, L., Wang, S., Zhao, D., & Li, J. (2017). The intention to adopt electric vehicles: Driven by functional and non-functional values. Transportation Research Part A: Policy and Practice, 103, 185-197. https://doi.org/10.1016/j.tra.2017.05.033

Jam, F. A., Akhtar, S., Haq, I. U., Ahmad-U-Rehman, M., & Hijazi, S. T. (2010). Impact of leader behavior on employee job stress: evidence from Pakistan. *European Journal of Economics, Finance and Administrative Sciences*, (21), 172-179.

Jing P, Huang H, Ran B, Zhan F, Shi Y. Exploring the Factors Affecting Mode Choice Intention of Autonomous Vehicle Based on an Extended Theory of Planned Behavior—A Case Study in China. Sustainability. 2019; 11(4):1155. https://doi.org/10.3390/su11041155

Li, W., Long, R., Chen, H., & Geng, J. (2017). A review of factors influencing consumer intentions to adopt battery electric vehicles. Renewable & Sustainable Energy Reviews, 78, 318–328. https://doi.org/10.1016/j.rser.2017.04.076

Li, W., Long, R., Chen, H., Yang, T., Geng, J., & Yang, M. (2018). Effects of personal carbon trading on the decision to adopt battery electric vehicles: Analysis based on a choice experiment in Jiangsu, China. Applied Energy, 209, 478–488. https://doi.org/10.1016/j.apenergy.2017.10.119

Mohammed, A.S., Atnaw, S.M., Salau, A.O., Eneh, J. N. (2023a). Review of optimal sizing and power management strategies for fuel cell/battery/super capacitor hybrid electric vehicles. Energy Reports, Vol. 9, pp. 2213-2228. DOI: 10.1016/j.egyr.2023.01.042

Mohammed, A.S., Salau, A.O., Sigweni, B., Zungeru, A.M. (2023b). Conversion and Performance Evaluation of Petrol Engine to Electric Powered Three-Wheeler Vehicle with an Onboard Solar Charging System. Energy Conversion and Management: X, Vol. 20, pp. 1-15. DOI: 10.1016/j.ecmx.2023.100427

Nasir, A. M., & Mustapa, I. R. (2024). Building The Nigerian Corporate Governance Index (NCGI) and Intellectual Capital Disclosure Practices. *Pakistan Journal of Life and Social Sciences*, *22*(1).

Ozaki, R., & Sevastyanova, K. (2011). Going hybrid: An analysis of consumer purchase motivations. Energy Policy, 39(5), 2217–2227. https://doi.org/10.1016/j.enpol.2010.04.024

Sanguesa, J. A., Torres-Sanz, V., Garrido, P., Martínez, F. J., & Marquez-Barja, J. M. (2021). A review on Electric Vehicles: Technologies and challenges. Smart Cities, 4(1), 372–404. https://doi.org/10.3390/smartcities4010022

Ting, T. T., Lee, S. C., Wee, M. C., & Chaw, J. K. (2024). Romantic relationship patterns, detailed covariates, and impacts on education: A study on young adults in the US using ICPSR dataset. Global Social Welfare, 11(2), 151-163. https://doi.org/10.1007/s40609-022-00254-7

Vafaei-Zadeh, A., Wong, T. K., Hanifah, H., Teoh, A. P., & Nawaser, K. (2022). Modelling electric vehicle purchase intention among generation Y consumers in Malaysia. Research in Transportation Business & Management, 43, 100784. https://doi.org/10.1016/j.rtbm.2022.100784

Wang, S., Li, J., & Zhao, D. (2017). The impact of policy measures on consumer intention to adopt electric vehicles: Evidence from China. Transportation Research Part A: Policy and Practice, 105, 14–26. https://doi.org/10.1016/j.tra.2017.08.013

Wang, S., Wang, J., Li, J., Wang, J., & Liang, L. (2018). Policy implications for promoting the adoption of electric vehicles: Do consumer's knowledge, perceived risk and financial incentive policy matter? Transportation Research Part A: Policy and Practice, 117, 58–69. https://doi.org/10.1016/j.tra.2018.08.014

Wang, Z., & Dong, X. (2016). Determinants and policy implications of residents' new energy vehicle purchases: the evidence from China. Natural Hazards, 82(1), 155–173. https://doi.org/10.1007/s11069-016-2185-4

Weiss, M., Zerfass, A., & Helmers, E. (2019). Fully electric and plug-in hybrid cars - An analysis of learning rates, user costs, and costs for mitigating CO2 and air pollutant emissions. Journal of Cleaner Production, 212, 1478–1489. https://doi.org/10.1016/j.jclepro.2018.12.019

Yang, H., & Wen, H. (2023, December). Factors Influencing the Acceptance of Small Electric Vehicles in China: An Extended Technology Acceptance Model Analysis. In 3rd International Conference on Digital Economy and Computer Application (DECA 2023) (pp. 336-345). Atlantis Press. https://doi.org/10.2991/978-94-6463-304-7_36.