INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 15, Issue 2, (2025) E-ISSN: 2222-6990

The Role of Perceived Risk and Environmental Concern in Consumers' Online Purchase Intention of Electric Cars in China

[1]Xie Zhen, [2]Raja Nerina Raja Yusof, [3]Mass Hareeza Ali

[1,2,3]School of Business and Economics, Universiti Putra Malaysia, Serdang, Selangor, Malaysia, [1]Yuncheng University, China

Corresponding Authors Email: wangqiang2369@gmail.com

To Link this Article: http://dx.doi.org/10.6007/IJARBSS/v15-i2/24703 DOI:10.6007/IJARBSS/v15-i2/24703

Published Date: 22 February 2025

Abstract

In response to the global energy crisis and escalating environmental pollution, many countries have decided to halt the production of traditional fuel cars. China has been the world's largest producer and seller of electric cars for several years and also dominates the online retail market. Chinese consumers are increasingly inclined to purchase electric cars through online platforms due to government policies. Although many consumer behaviour researchers have been focusing on China's online retail and electric car markets recently, there has been limited integration of these two areas in research. Consequently, this paper aimed to address this research gap by examining how perceived risk (PR) and environmental concern (EC) influence Chinese consumers' attitudes (CA) to purchase electric cars online. This study utilized the Technology Acceptance Model (TAM) to conduct a comprehensive analysis of the impact of perceived ease of use (PEU), perceived usefulness (PU), PR, and EC on CA and subsequently examine how these factors affect their purchasing intention (PI). A quantitative approach was employed, utilising a self-administered questionnaire for data collection, and descriptive and inferential analysis methods were applied to process the data in accordance with the research objectives. Data collection was conducted by means of online questionnaires, and the partial least squares (PLS) structural equation modelling based on variance analysis was employed to test the research hypotheses (H). This study enhances the applicability of the TAM in elucidating the behaviour of consumers regarding the online purchase of electric cars. Furthermore, it offers practical strategies and interactive guidelines for policymakers, e-commerce platforms, electric car manufacturers, and other stakeholders to steer consumers' online car purchasing decisions.

Keywords: Electric Cars, Technology Acceptance Model (TAM), Perceived ease of Use (PEU), Perceived Usefulness (PU), Perceived Risk (PR), Environmental Concern (EC), Consumers' Attitudes (CA), Purchase Intention (PI)

Introduction

In recent years, China has confronted formidable energy challenges. Over the past five years, statistics from National Bureau of Statistics reveal that the rapid surge in car ownership has propelled an average annual gasoline consumption growth exceeding 5%, making energy scarcity, particularly gasoline for automobiles, an increasingly pressing issue annually (National Bureau of Statistics, 2023). Additionally, Ministry of Environmental Protection (2024) report highlights that exhaust emissions from conventional internal combustion engine car have emerged as a significant contributor to air pollution, with their pollution share steadily escalating over the past five years, further deteriorating air quality. Consequently, studying the factors influencing consumers' purchase of electric car is of paramount urgency, given their potential to mitigate energy constraints and curtail environmental degradation, thereby promoting electric car as a viable solution.

The transition from purchase intention to purchase behavior constitutes a pivotal step in the consumer decision-making journey. Over the past five years, research on online shopping and electric car purchases has proliferated, yet few studies have seamlessly integrated these two domains. Consequently, this study endeavors to bridge this gap by exploring the multifaceted factors influencing consumers' online electric car purchases, a pursuit of paramount significance.

An investigation into the challenges of online electric car purchases would necessitate the highlighting of several crucial aspects that encapsulate both consumer concerns and unresolved issues within the industry and policy domains. Firstly, a significant barrier to the widespread adoption of online electric car purchases is the heightened perceived risk (PR) that consumers frequently encounter when engaging in such purchases. This risk arises particularly from uncertainties regarding product quality and concerns pertaining to after-sales service guarantees (Zhang & Zhao, 2023). Secondly, environmental concern (EC), which is increasingly salient among consumers, are notably prevalent in online electric car sales. Despite the significant reduction in carbon emissions and environmental benefits offered by the use of electric cars, the environmental impact of their production and battery recycling processes cannot be overlooked, as emphasised by Heng et al. (2024). Lastly, government policy has played a pivotal role in fostering online electric car sales. To incentivise consumers to use more environmentally sustainable travel modes, the government has implemented a range of measures, including car purchase subsidies and tax reductions, and expedited the development of charging infrastructure, as reported by Abas and Tan (2024). This study explored the influence of PR and EC on consumers' attitudes (CA), and examined how these attitudes mediate consumers' perceived ease of use (PEU), perceived usefulness (PU), PR, and EC, ultimately affecting their purchase intention (PI). This study offers valuable insights for policymakers, marketers, and industry stakeholders, and establishes a foundation for future research on the complex motivations driving consumers to purchase electric cars online.

Literature Review

The Technology Acceptance Model (TAM), initially proposed by Davis (1989), is designed to elucidate and predict individual users' acceptance of information technology. The core of the model revolves around two pivotal constructs: PEU and PU. PEU refers to the extent to which users perceive that utilising an information system enhances their work performance, whereas PU pertains to the simplicity of use of a system. With the rapid progress of

information technology, the TAM has undergone significant extensions, incorporating additional variables, notably the TAM2 (Venkatesh & Davis, 2000) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), to offer a more nuanced understanding of user acceptance behaviour in intricate technological environments.

Hypotheses (H) Development

Effect of Perceived Ease of Use (PEU) on Perceived Usefulness (PU)

Eryolanda et al. (2024) conducted a comprehensive study on the PU of electric car purchases made through online platforms, emphasising that the convergence of convenience, quick access to information, and the potential to save money that consumers experience when making online electric car transactions, constitutes the cornerstone of perceived utility. Several empirical studies have consistently shown that when consumers perceive that a technology is easy to use and operate, they are more likely to attribute a greater value to it and will be more inclined to adopt and accept it (Förster, 2024; Jumbri et al., 2024; Liu & Mensah, 2024). When applied to specific domains, the impact of PEU on PU is particularly evident in the fields of online shopping and electric car purchases. For example, Zainol Alam et al. (2023) highlighted the significant predictive power of PEU in shaping consumers' PU on online shopping platforms. Similarly, in the context of electric car purchases, Vishwakarma (2024) found that potential buyers who perceive that electric cars are easy to operate and maintain are more inclined to appreciate their practical advantages. Therefore, based on a careful examination of the above premises, the following hypothesis (H) was proposed as the cornerstone of this study:

H1 : There is a positive correlation between consumers' PEU and PU of purchasing electric cars online in China.

Effect of Perceived Ease of Use (PEU) on Consumers' Attitudes (CA)

In the realm of online electric car consumption, PEU serves as a pivotal factor that influences consumer behaviour and adoption. This concept encapsulates the customers' perceived convenience when acquiring electric cars via digital platforms. It comprehends both the accessibility and comprehensiveness of the information, as well as the seamlessness of the entire transaction process, encompassing factors like the intuitive nature of the purchase interface, the time efficiency of the completion of the sale, and the overall satisfaction derived from the digital experience (von Böhlen & Šimberová, 2023). Multiple studies have consistently demonstrated a strong correlation between CA towards a product, service, or technology and the perceived ease and straightforwardness of adoption(Putra et al., 2023; Renaldy & Susilowati, 2024; Wang, 2023). The empirical validation of the relationship between PEU and CA across various domains underscores its transcendent nature and general applicability. For instance, in luxury online retail purchases, Jokhu (2022) found that the ease of browsing and completing transactions significantly enhances consumer acceptance and CA towards online luxury purchases. Likewise, this relationship was replicated in mobile data services, with ease of access and usage emerging as a pivotal factor influencing CA. Additionally, the significance of PEU extends to emerging technologies and infrastructure, exemplified by its role in fostering the acceptance of electric car charging stations. Vithayathil (2023) demonstrated that the intention of consumers to accept electric cars increases when they perceive that the charging infrastructure is user-friendly. Consequently, based on a thorough examination of the aforementioned premises, this study proposed the following H as the foundation of its research:

H2 : There is a positive correlation between consumers' PEU and CA of purchasing electric cars online in China.

Effect of Perceived Usefulness (PU) on Consumers' Attitudes (CA)

Consumers' attitudes (CA) towards online electric car purchases can be construed as a manifestation of their overall stance towards acquiring electric cars via digital channels. This attitude arises from the perception that online electric car purchases confer numerous advantages, such as improved convenience, time efficiency, broader choice options, enhanced capability for a comprehensive price, and configuration evaluations, as well as a deeper comprehension of the performance metrics and distinctive features of the vehicle (Wang et al., 2024). A comprehensive review of the literature showed that the researchers generally agreed that CAs towards a particular product, service, or technology are intricately intertwined with their perceptions of the usefulness that results from adopting that product, service, or technology, highlighting the importance of addressing consumer perceptions in promoting adoption attitudes (Fricke et al., 2024; Pamungkas, 2023; Vishwakarma, 2024). This link between PU and CA has been demonstrated in different domains. For example, research in the field of electric car technology has highlighted the important role of PU in driving CA towards the adoption of electric cars (Salim et al., 2024). Similarly, in the digital domain, PU for online banking services has been shown to be a key determinant of CA in the mobile data ecosystem (Nasution & Rahmat, 2023). Therefore, based on a careful examination of the above premises, the following H was proposed as the cornerstone of this study:

H3 : There is a positive correlation between consumers' PU and CA of purchasing electric cars online in China.

Effect of Perceived Risk (PR) on Consumers' Attitudes (CA)

In the realm of online electric car purchases, PR constitutes a multidimensional construct encompassing the consumers' subjective assessments of uncertainty and potential negative consequences associated with these transactions. According to Hasan et al. (2024), this phenomenon covers a broad spectrum of concerns, ranging from vehicle safety and transaction security to after-sales service quality, product reliability, and the potential infringement of personal privacy. Several studies revealed that PR negatively influences consumer perceptions towards novel products/services, thereby affecting subsequent CAs (Cabeza-Ramírez et al., 2022; Dones et al., 2023; Shaliha & Marsasi, 2024). The intricate interplay between PR and CA has been proven across various industries and disciplines. For instance, PR is universally regarded as a notable hindrance to CA in the adoption of cutting-edge technologies (Featherman et al., 2021). On becoming aware of the PR surrounding the adoption and usage of electric cars, consumers tend to harbour negative sentiments, ultimately diminishing their adoption intentions (Cabeza-Ramírez et al., 2022). Therefore, based on a careful examination of the above premises, the following H was proposed as the cornerstone of this study:

H4 : There is a negative correlation between consumers' PR and CA of purchasing electric cars online in China.

Effect of Environmental Concerns (EC) on Consumers' Attitudes (CA)

Upon deeper exploration of the ECs influencing online purchases of electric cars, the notion of "*green consumer awareness*" emerged as pivotal. It was defined comprehensively by Frank

et al. (2023) as the proactive mindset and tendency of individuals to engage in environmentally responsible actions, particularly when selecting electric cars as a means of transportation, to mitigate their ecological impact. A comprehensive review of the literature showed that researchers generally believed that CA towards a particular product, service, or technology are intricately intertwined with their EC about adopting that product, service, or technology, emphasising the importance of addressing ECs in promoting CAs (X. He et al., 2023; Jose & Muhammed, 2024; Malhotra et al., 2024). This link between EC and CA has been confirmed in different fields. For example, by studying the behaviour of British car owners, it has been found that consumers have a positive attitude towards the idea of owning an electric car as they do not want the environment to deteriorate rapidly (H. He et al., 2021). Similarly, Zhao (2024) believed that online shopping saves multiple logistics transfers, which correspondingly reduce environmental pollution, and also indirectly protects the environment. Therefore, based on a careful examination of the above premises, the following H was proposed as the cornerstone of this study:

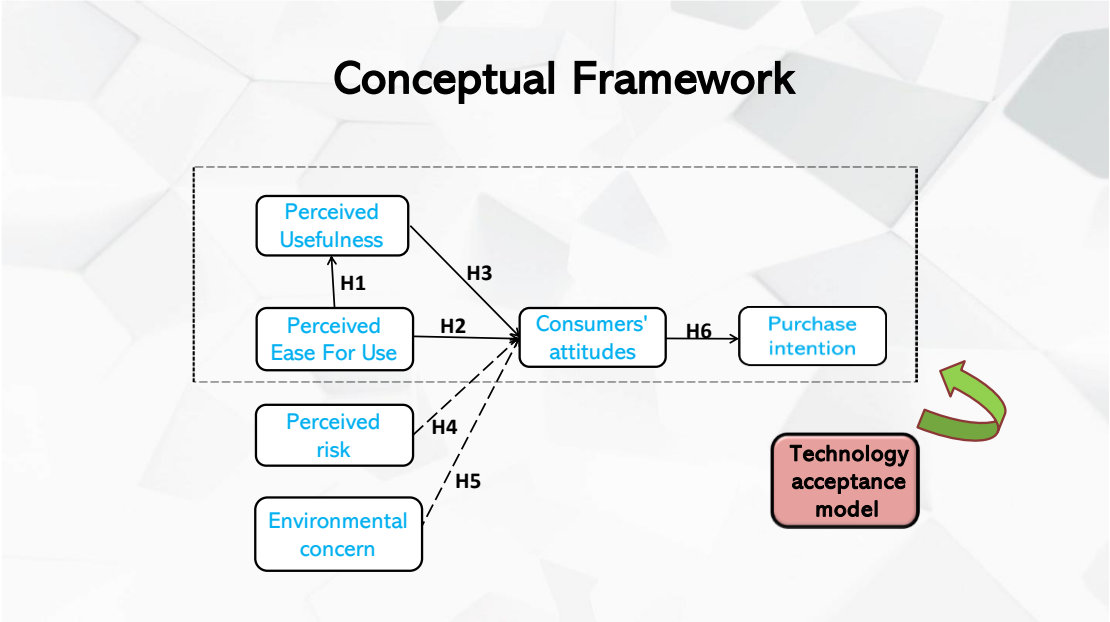
H5 ： There is a positive correlation between consumers' EC and CA of purchasing electric cars online in China.

Effect of Consumers' Attitudes (CA) on Purchase Intentions (PI)

The phenomenon of the propensity of consumers to purchase electric cars, notably defined as a "*positive, digital predisposition toward acquiring electric car via online channels*", has garnered significant attention (Anastasiadou & Gavanas, 2022). A meticulous review of the extant literature revealed a universal consensus among researchers, acknowledging CA as a pivotal factor influencing PI. This common understanding underscores the imperative to integrate strategies aimed at fostering CA into interventions geared towards enhancing PI (Anastasiadou & Gavanas, 2022; Li et al., 2024; Zhao, 2024). The intricate interplay between CA and PI has been corroborated across various disciplines, reinforcing its central role in elucidating and anticipating consumer behaviour. For instance, in the realm of e-commerce, CA towards online shopping platforms has been shown to correlate with their subsequent PI (Xue et al., 2023). Likewise, the electric car industry serves as a prime example of the pre-eminence of the consumer attitude-purchase intention (CA-PI) paradigm. Xue et al. (2023) observed that individuals harbouring positive sentiments towards electric cars demonstrated a heightened PI, reinforcing the notion that a stronger positive conceptual alignment fosters more pronounced behavioural commitment. Therefore, based on a careful examination of the above premises, the following H was proposed as the cornerstone of this study:

H6: There is a positive correlation between CA and the intentions of consumers to purchase (PI) electric cars online in China.

Conceptual Framework



Methodology

This research employed a survey methodology as its foundational approach, recognising its advantage in producing standardised, quantifiable data on variables and their intricate relationships. This standardised framework enables consistent comparisons across respondents and aids in identifying patterns and trends in the collected data. To minimise self-reporting biases and ensure response accuracy, the survey instrument was carefully designed to include only close-ended questions. By restricting the respondents' responses to a predefined set of options, this design reduces ambiguity and enhances the reliability of the answers. Furthermore, to enrich the details of the data and allow for a more nuanced analysis, a 5-point Likert scale, ranging from "completely agree" to "completely disagree," was incorporated into the questionnaire.

This research aimed to establish gender equality among individuals aged 18-70 years, ensuring an equal representation of both genders. This age range encompassed individuals actively engaged in consumer behaviour, thus making the research findings representative and insightful. The questionnaire response collection period was set from March-April 2024, ensuring a focused and timely acquisition of data. The primary objective of this study was to explore the multifaceted factors influencing Chinese consumers' online purchases of electric cars. Based on the framework proposed by Hoffmeyer-Zlotnik & Warner (2018), the analysis focused on the primary study objective, complemented by relevant accumulated data specifically targeting Chinese consumers who had successfully purchased electric cars online. To ensure the integrity and authenticity of the data, rigorous standards were incorporated into the questionnaire design. These standards, based on recent research by Q. Wang et al. (2023), required the respondents to have had prior online shopping experience. By excluding respondents without relevant experience, the study minimised potential biases and enhanced the credibility of the results, providing a clearer understanding of the factors driving the digital electric car purchasing decisions of Chinese consumers. The questionnaires were distributed through various popular online communication tools in China, including QQ, WeChat, and email (Salama et al., 2023). To guarantee the highest data quality and minimise errors

stemming from ambiguous, incomplete, or conflicting responses, the study devised a thorough data collection strategy. The goal was to distribute 1000 questionnaires to Chinese consumers who had purchased electric cars online, specifically targeting three major cities in China, namely, Beijing, Shanghai, and Shenzhen. The selection of these cities as research sites was influenced by multiple factors.

This study employed interval scales to quantify six constructs that had been tailored for distinctly rankable data with substantial value fluctuations (Ferrante et al., 2020). Interval scales ensure consistent and uniform spacing between scores, enabling accurate assessments(Kaptein et al., 2010). Likert-type scales effectively capture the responses of respondents to specific items, facilitating the evaluation of their ratings (Kaptein et al., 2010). Consequently, a 5-point Likert scale was adopted for all the variables in this extensive study. To thoroughly examine the collected data, two reliable statistical software tools were utilised to ensure the rigorousness and validity of the findings.

Data Analysis

According to Table 5.1, 50.44% of the respondents were male and 49.56% were female. Most of them (23.11%) were aged ≥51 years, whereas the smallest proportion (18.22%) were aged 26-30 years. Most of the respondents hailed from Shanghai (34.89%), had diplomas (22.44%), earned ≥CNY20001 (28.67%), had purchased hybrid electric cars online (52%), and had 6-10 years of driving experience (29.78%).

Table 5.1
The Respondents' Profile

Demographic Profile			Frequency	Percentage (%)
1. Gender				
Male			227	50.44
Female			223	49.56
2. City of residence				
Beijing			140	31.11
Shanghai			157	34.89
Shenzhen			153	34.00
3. Age (years)				
18-25			87	19.33
26-30	82	18.22		
31-40			93	20.67
41-50			84	18.67
≥ 51			104	23.11

Table 5.1
Continued

Demographic Profile			Frequency	Percentage (%)
4. Education level				
High school			94	20.89
Diploma	101	22.44		
Degree			86	19.11
Post-graduate			85	18.89
Professional			84	18.67
5. Income level (CNY)				
≤ 5000			111	24.67
5001-10000			111	24.67
10001-20000			99	22.00
≥ 20001			129	28.67

Table 5.1
Continued

Demographic Profile	Frequency	Percentage (%)
6. Have you ever purchased an electric car online before?		
Yes	450	100
No	0	0
7. If yes, what type of electric car did you purchase?		
Hybrid electric car	234	52.00
Battery electric car	216	48.00
8. Driving experience (years):		
≤ 5	98	21.78
6-10	134	29.78
11-15	109	24.22
≥ 16	109	24.22
Total	**450**	**100**

Convergent validity, a critical dimension in evaluating the psychometric properties of measurement instruments, pertains to the degree of positive and meaningful correlations between a construct and alternative indicators of the same construct in formative measures, encompassing both reflective and single-item approaches. As detailed by dos Santos & Cirillo (2023) this conceptual framework underscores the necessity of ensuring coherence across varying operational definitions of a theoretical concept. The two primary statistical indicators utilised in evaluating convergent validity are external loadings and AVE. dos Santos & Cirillo (2023) suggested a benchmark of ≥0.708 for external loadings, signifying a substantial degree of convergence between items and the underlying construct. Furthermore, in a partial least squares (PLS) model, a reflective item with a loading of <0.4 may indicate insufficient representation of the construct and warrants consideration for removal from the measurement model. (Rubia, 2019) proposed that an AVE of ≥0.5 signifies a substantial variance shared among indicators within the construct, thereby demonstrating a high

convergent validity. Adhering to this threshold ensures that the indicators exhibit positive correlations and converge appropriately to accurately measure the underlying construct. Researchers can ensure the effectiveness and reliability of their measurement instruments by adhering to the recommended thresholds of 0.708 for external loadings and 0.5 for AVE, thereby accurately capturing the essence of the studied constructs.

As presented in Table 5.2, the AVE for PU (0.726), PEU (0.666), PR (0.65), EC (0.686), CA (0.67), and PI (0.658) were all >0.5, surpassing the critical threshold of 0.5. This achievement signified that these constructs demonstrated a satisfactory convergent validity, a crucial prerequisite for ensuring the reliability and internal consistency of the measurement model.

Table 5.2
A Summary of the Results of the Reflective Constructs

Construct	**Indicator**	**Loading**	**CR**	**AVE**
Perceived usefulness (PU)	PU1	0.845	0.909	0.726
	PU2	0.848		
	PU3	0.849		
	PU4	0.888		
	PU5	0.828		
Perceived ease of use (PEU)	PEU1	0.829	0.875	0.666
	PEU2	0.812		
	PEU3	0.811		
	PEU4	0.816		
	PEU5	0.811		
Perceived risks (PR)	PR1	0.793	0.867	0.65
	PR2	0.815		
	PR3	0.786		
	PR4	0.817		
	PR5	0.82		

Table 5.2
Continued

Construct	Indicator	Loading	CR	AVE
Environmental concerns (EC)	EC1	0.822	0.886	0.686
	EC2	0.832		
	EC3	0.853		
	EC4	0.797		
	EC5	0.837		
Consumers' attitudes (CA)	CA1	0.834	0.877	0.67
	CA2	0.82		
	CA3	0.818		
	CA4	0.796		
	CA5	0.822		

Table 5.2
Continued

Construct	Indicator	Loading	CR	AVE
Purchase intention (PI)	PI1	0.798	0.873	0.658
	PI2	0.824		
	PI3	0.819		
	PI4	0.777		
	PI5	0.838		

Table 5.3 presents a comprehensive summary of the path coefficient analysis outcomes for all the directly hypothesised relationships investigated. The statistical significance of these relationships was evident, as their *p* fell below the threshold of 0.05 at the 95% confidence interval. Specifically, PEU -> PU (*β*=0.587, *t*=19.941, *p*=0.000), PEU -> CA (*β*=0.291, *t*=6.392, *p*=0.000); PU -> CA (*β*=0.209, *t*=5.091, *p*=0.000); PR -> CA (*β*=-0.264, *t*=6.641, *p*=0.000); EC -> CA (*β*=0.217, *t*=5.418, *p*=0.000); CA -> PI (*β*=0.39, *t*=10.334, *p*=0.000). In conclusion, the findings of this study confirmed the validity of the aforementioned H.

Table 5.3
The Results of the Path Co-efficient Assessment

H	*β*	M	S.D.	*t*	*p*	Result
H1: Perceived ease of use (PEU) -> Perceived usefulness (PU)	0.587	0.589	0.029	19.941	0	Significant
H2: Perceived ease of use (PEU) -> Consumers' attitudes (CA)	0.291	0.29	0.046	6.392	0	Significant
H3: Perceived usefulness (PU) -> Consumers' attitudes (CA)	0.209	0.207	0.041	5.091	0	Significant
H4: Perceived risk (PR) -> Consumers' attitudes (CA)	-0.264	-0.266	0.04	6.641	0	Significant
H5: Environmental concern (EC) -> Consumers' attitudes (CA)	0.217	0.219	0.04	5.418	0	Significant
H6: Consumers' attitudes (CA) -> Purchase intention (PI)	0.39	0.391	0.038	10.334	0	Significant

The key findings of the H evaluations are concisely summarised below:

Table 5.4
A Summary of the Results of the Proposed Hypotheses (H)

H		Standard *β*	T	Result
H1	There is a positive correlation between consumers' PEU and PU of purchasing electric cars online in China.	0.587	7.156	Supported
H2	There is a positive correlation between consumers' PEU and CA of purchasing electric cars online in China.	0.291	6.392	Supported
H3	There is a positive correlation between consumers' PU and CA of purchasing electric cars online in China.	0.209	5.091	Supported

Table 5.4
Continued

H		Standard *β*	T	Result
H4	There is a negative correlation between consumers' PR and CA of purchasing electric cars online in China.	-0.264	6.641	Supported
H5	There is a positive correlation between consumers' EC and CA of purchasing electric cars online in China.	0.217	5.418	Supported
H6	There is a positive correlation between CA and the intentions of consumers to purchase (PI) electric cars online in China.	0.39	10.334	Supported

Discussion and Conclusions

Discussion

Correlation between Perceived Ease of Use (PEU) and Perceived Usefulness (PU)

Hypothesis (H)1 posits a robust and statistically significant positive correlation between PEU and PU. Specifically, it states that as consumers' PEU of a technology increases, CA of the usefulness or practicality of the technology will also increase accordingly. The empirical results of this study provided strong support for H1, with a statistically significant positive

correlation between PEU and PU (β=0.587, p=0.000). This result not only verified H1, but also strengthened the theoretical framework of the TAM proposed by Davis (1993).

The comprehensive study underscored the pivotal role of PEU, a fundamental element within the TAM, in influencing consumers' PU of online electric car purchases. This revelation emphasised the necessity for strategic interventions during the digital electric car purchasing process, focused on enhancing user experience to ultimately drive consumer adoption and satisfaction. Consequently, this study recommends that e-commerce platforms and automotive manufacturers, acknowledging the significance of PEU, prioritise the design of intuitive and user-centric interfaces for their online electric car portals. This should encompass the streamlining of the browsing, selection, and checkout procedures, thus guaranteeing seamless access to product specifications, facilitating model comparisons and enabling customers to make well-informed choices.

Correlation between Perceived Ease of Use (PEU) and Consumers' Attitudes (CA)
Hypothesis (H)2 posits a robust and statistically significant positive correlation between PEU and CA, suggesting that as consumers perceive technology as easier to use, their favourable CA towards adopting the technology increase proportionally. The empirical findings of this study robustly supported H2, exhibiting a statistically significant positive correlation between PEU and CA (β=0.291, p=0.000).

This study aimed to explore the intricate relationship between PEU and CA towards online electric car purchases. Utilising the TAM theoretical framework, PEU emerged as a pivotal factor influencing CA towards online electric car purchases. This study sought to broaden the current understanding by thoroughly investigating the impact of PEU of online electric car purchases on CAs, both favourable and unfavourable, towards engaging in online electric car transactions. The objective of this study was to offer practical insights for policymakers, automakers, and e-commerce platforms, with the aim of enhancing the user experience and ultimately promoting a more favourable CA towards the adoption of online electric car purchase practices.

Correlation between Perceived Usefulness (PU) and Consumers' Attitudes (CA)
Hypothesis (H)3 postulates a robust and statistically significant positive correlation between PU and CA. In particular, as CA of the usefulness of technological operations escalates, their attitude towards adopting the technology is predicted to increase proportionately. The empirical findings of this study robustly supported H3, with a statistically significant positive correlation observed between PEU and CA (β=0.291, p=0.000).

This study delved into the intricate interplay between PU and CA of online electric car purchases, extending the theoretical foundations of the TAM. With the rising popularity of electric car purchases on online marketplaces, understanding the factor influencing CA has become paramount. The primary objective of this study was to empirically validate the pivotal role of PU in shaping CA towards online electric car purchases. This study further contributes to the understanding of how PU can be a catalyst for CA, ultimately providing valuable insights for practitioners and policymakers. The findings of this study will provide information for the development of marketing strategies for electric car retailers, emphasising the enhancement

of both the online shopping experience and PU, thereby fostering a more favourable CA and ultimately boosting online sales of electric cars.

Correlation between Perceived Risks (PR) and Consumers' Attitudes (CA)

Hypothesis (H)4 posits a robust and statistically significant negative correlation between PR and CA. Specifically, as PR increases, the CA towards the adoption of the technology decreases correspondingly. The empirical results strongly supported H4, demonstrating a statistically significant negative correlation between PR and CA (β=-0.264, p=0.000). This finding not only confirmed H4 but also aligned with previous research that identified PR as a crucial predictor of CA.

The present study uncovered PR as a pivotal factor influencing CA. These findings can contribute to the development of tailored marketing strategies and robust risk mitigation frameworks aimed at enhancing CA and fostering a wider adoption of online electric car purchases. Consequently, automakers and e-commerce platforms are advised to implement efficacious strategies that emphasise benefits, address concerns, and foster trust, thereby substantially elevating CA. On the other hand, misguided or inadequately aligned efforts may inadvertently intensify the PR, potentially resulting in the rejection of inherently valuable products.

Correlation between Environmental Concerns (EC) and Consumers' Attitudes (CA)

Hypothesis (H)5 posits a robust and statistically significant positive correlation between EC and CA. Specifically, as consumer concern for environmental issues escalates, it is predicted that CA will correspondingly increase. The empirical results of this study provided strong support for H5, with a statistically significant positive correlation between EC and CA (β=0.217, p=0.000). This result not only validated H5 but also aligned with prior research that anticipated EC as a crucial determinant of CA.

Based on the compelling findings of this study that highlighted the critical role played by EC in influencing CA towards online electric car purchases, this study aimed to delve deeper into the multifaceted CA towards electric cars as an environmentally sustainable alternative to improve CA and promote the widespread adoption of online electric car purchases. Therefore, it is recommended that policymakers, marketers, and industry stakeholders incorporate ECs into their strategies to better align their efforts with the evolving consumer sentiment towards ECs, including not only the immediate benefits of reduced emissions but also the long-term impact of the ownership of electric cars on climate change and personal sustainable development goals, and evaluate the effectiveness of marketing strategies that emphasise the environmental advantages of electric cars, thereby leveraging the power of ECs to drive sustainable consumption patterns.

Correlation between Consumers' Attitudes (CA) and Purchase Intentions (PI)

Hypothesis (H)6 posits a robust and statistically significant positive correlation between CA and PI, suggesting that an increase in CA among consumers corresponds to an increase in PI. The empirical results of this study provided strong support for H6, with a statistically significant positive correlation between CA and PI (β=0.39, p=0.000). This finding not only validated H6 but also aligned with prior research that identified EC as a key predictor of CA.

This study investigated the intricate relationship between CA and PI in the context of online electric car purchases, based on the principles of the Theory of Planned Behaviour. This H posits that CA, a pivotal factor, significantly influences the formation of consumers' PI towards online electric cars. By delving into the multifaceted dimensions of CAs, encompassing beliefs, attitudes, and evaluations of electric cars and online shopping encounters, this study endeavoured to uncover the underlying mechanisms that either facilitate or impede individuals' engagement in this nascent automotive retail paradigm. Consequently, policymakers, automakers, and e-commerce platforms are advised to foster positive CAs, thereby augmenting their propensity to engage in transactional activities. Enhancing CA towards ECs, technological advancements, and the cost-effectiveness of electric cars, coupled with promoting positive CAs of the convenience, security, and product variety offered by online platforms, can bolster PI.

Conclusions

This study employs a robust interdisciplinary approach, integrating diverse knowledge domains including psychology, behavioral economics, environmental science, and information technology, to develop a comprehensive and nuanced analytical framework. This multifaceted approach enhances the comprehension of the intricate psychological dynamics driving consumers' online electric car purchasing decisions, while offering a valuable navigational tool for researchers in adjacent disciplines.

This comprehensive analysis not only broadened the theoretical perspectives but also enhanced the practical application of frameworks, such as the TAM, in the complex domain of electric car adoption behaviour. By integrating these theoretical constructs into a coherent framework, this study clarified the complex interactions among various factors that influence the decision of consumers to adopt electric cars. The insights obtained from this research provide significant guidance to various stakeholders. For emerging scholars initiating research on consumer behaviour, this study provides an empirical foundation and concrete data insights, enabling a deeper understanding of the psychological factors and motivations underlying the PI towards electric cars. Those responsible for improving online sales platforms can reduce consumers' PR related to electric car purchases and foster trust and confidence. Additionally, electric car manufacturers can derive substantial benefits from this research. By emphasising the environmental attributes and user experience of their products, automakers can actively improve these aspects to optimise consumers' PI.

References

Abas, P. E., & Tan, B. (2024). Modeling the impact of different policies on electric vehicle adoption: An investigative study. *World Electric Vehicle Journal*, *15*(2), 52. https://doi.org/10.3390/wevj15020052

Anastasiadou, K., & Gavanas, N. (2022). State-of-the-art review of the key factors affecting electric vehicle adoption by consumers. *Energies*, *15*(24), 9409. https://doi.org/10.3390/en15249409

Cabeza-Ramírez, L. J., Sánchez-Cañizares, S. M., Santos-Roldán, L. M., & Fuentes-García, F. J. (2022). Impact of the perceived risk in influencers' product recommendations on their followers' purchase attitudes and intention. *Technological Forecasting and Social Change*, *184*, 121997. https://doi.org/10.1016/j.techfore.2022.121997

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Delle Vicende Dell'agricoltura in Italia; Studio e Note Di C. Bertagnolli.*, *13*(3), 319–340. https://doi.org/10.5962/bhl.title.33621

Davis, F. D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *International Journal of Man-Machine Studies*, *38*(3), 475–487. https://doi.org/10.1006/imms.1993.1022

Dones, V., Flecha-Ortiz, J., Santos-Corrada, M., & Lopez, E. (2023). Do not run out of toilet paper! The risk communication on perceived risk on consumer behavior during the crisis COVID-19. *International Journal of Pharmaceutical and Healthcare Marketing*, *17*(3), 380–404. https://doi.org/10.1108/IJPHM-07-2021-0074

Santos, P. M., & Cirillo, M. Â. (2023). Construction of the average variance extracted index for construct validation in structural equation models with adaptive regressions. *Communications in Statistics - Simulation and Computation*, *52*(4), 1639–1650. https://doi.org/10.1080/03610918.2021.1888122

Eryolanda, E. I., Sukanto, A. G., Teasari, I., Mahyudi, A., Purnomo, A. Y., & Istijanto. (2024). Factors that influence electric vehicle purchase intention: an evidence from Indonesia. *Matrik : Jurnal Manajemen, Strategi Bisnis Dan Kewirausahaan*, 86. https://doi.org/10.24843/MATRIK:JMBK.2024.v18.i01.p07

Featherman, M., Jia, S. J., Califf, C. B., & Hajli, N. (2021). The impact of new technologies on consumers beliefs: Reducing the perceived risks of electric vehicle adoption. *Technological Forecasting and Social Change*, *169*(May), 120847. https://doi.org/10.1016/j.techfore.2021.120847

Ferrante, M., Ferro, N., & Losiouk, E. (2020). How do interval scales help us with better understanding IR evaluation measures? *Information Retrieval Journal*, *23*(3), 289–317. https://doi.org/10.1007/s10791-019-09362-z

Förster, K. (2024). Extending the technology acceptance model and empirically testing the conceptualised consumer goods acceptance model. *Heliyon*, *10*(6), e27823. https://doi.org/10.1016/j.heliyon.2024.e27823

Frank, D. A., Chrysochou, P., & Mitkidis, P. (2023). The paradox of technology: Negativity bias in consumer adoption of innovative technologies. *Psychology & Marketing*, *40*(3), 554–566. https://doi.org/10.1002/mar.21740

Fricke, A., Pieper, N., & Woisetschläger, D. M. (2024). Smartness unleashed: a multilevel model for understanding consumers' perceptions and adoption across a myriad of smart offerings. *Journal of Service Theory and Practice*, *34*(2), 163–190. https://doi.org/10.1108/JSTP-12-2022-0269

Hasan, F., Zaidi, N., Kirmani, M. D., Kumar, A., Zahidi, F., & Rehman, A. (2024). Exploring the predictors of intention to purchase electric vehicles. *2024 International Conference on Electrical Electronics and Computing Technologies (ICEECT)*, *18*(1), 1–6. https://doi.org/10.1109/ICEECT61758.2024.10739004

He, H., Wang, C., Wang, S., Ma, F., Sun, Q., & Zhao, X. (2021). Does environmental concern promote EV sales? Duopoly pricing analysis considering consumer heterogeneity. *Transportation Research Part D: Transport and Environment*, *91*, 102695. https://doi.org/10.1016/j.trd.2021.102695

He, X., Hu, Y., & Hong, Z. (2023). Consumers' intention to purchase electric vehicles: the moderating role of environmental awareness. *Journal of Environmental Planning and Management*, *68*(4), 935–956. https://doi.org/10.1080/09640568.2023.2276060

Heng, T. Y., Ho, R. S., Pushpanathan, H. A., & Hu, A. Y. (2024). Factors influencing online shopping behavior of customers: A case study on Shopee. *International Journal of Tourism and Hospitality in Asia Pasific*, *7*(2), 105–119. https://doi.org/10.32535/ijthap.v7i2.3253

Hoffmeyer-Zlotnik, J. H. P., & Warner, U. (2018). Data processing units. In *Sociodemographic Questionnaire Modules for Comparative Social Surveys. SpringerBriefs in Population Studies.* (pp. 113–117). Springer, Cham. https://doi.org/10.1007/978-3-319-90209-8_10

Jokhu, J. R. (2022). Care about the way you look? Website quality impact on purchase decision mediated by ewom and ease of use. *Jurnal Ilmiah Manajemen Dan Bisnis*, *8*(3), 293–306. https://doi.org/10.22441/jimb.v8i3.17013

Jose, R., & Muhammed, S. V. (2024). Influence of sustainability concern in the purchase decisions of customers: A study on electronic goods. *International Journal of Advanced Research in Science, Communication and Technology*, *4*(1), 136–139. https://doi.org/10.48175/IJARSCT-22022

Jumbri, J. A., Chai, M. L., Ismail, A. F. M. F., Jamal, F. N., Kurnianingrum, D., & Karmagatri, M. (2024). Customer acceptance for self-service technologies in Malaysian fast-food restaurants: An empirical study. *Advances in Social Sciences Research Journal*, *11*(9), 220–233. https://doi.org/10.14738/assrj.119.17577

Kaptein, M. C., Nass, C., & Markopoulos, P. (2010). Powerful and consistent analysis of likert-type rating scales. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2391–2394. https://doi.org/10.1145/1753326.1753686

Li, C., Wang, X., & Wang, L. (2024). Examining the crucial societal incentive approaches and their impact mechanisms to enhance the purchase intention of carbon-labeled products: A conjoined application of PLS-SEM and NCA methodologies. *Energy & Environment*. https://doi.org/10.1177/0958305X241251405

Liu, Y., & Mensah, I. K. (2024). Using an extended technology acceptance model to understand the behavioral adoption intention of mobile commerce among Chinese consumers. *Information Development*. https://doi.org/10.1177/02666669241277153

Malhotra, R., Garg, V., Aggarwal, P., Aggarwal, A., Bansal, O., & Tusnial, B. (2024). Consumer perception and buying behaviour regarding Eco-friendly products. *Journal of Business Management and Information Systems*, *11*(1), 54–65. https://doi.org/10.48001/jbmis.1101005

Ministry of Environmental Protection. (2024). *China Environmental Bulletin 2023*. Https://Www.Mee.Gov.Cn/Hjzl/Sthjzk/Zghjzkgb/202406/P020240604551536165161.Pdf. https://www.mee.gov.cn/hjzl/sthjzk/zghjzkgb/202406/P020240604551536165161.pdf

Nasution, I. H., & Rahmat, R. (2023). Analysis of customer interest using soe bank mobile banking with technology acceptance models. *Jurnal Multidisiplin Sahombu*, *3*(01), 16–23. https://doi.org/10.58471/jms.v3i01.1598

National Bureau of Statistics. (2023). *China Statistical Yearbook*. https://www.stats.gov.cn/sj/ndsj/2023/indexch.htm

Pamungkas, D. D. A. (2023). The influence of perceived value and product involvement towards purchase intention mediated by attitude. *Journal of World Science*, *2*(7), 989–997. https://doi.org/10.58344/jws.v2i7.312

Putra, R. A., Ahmad, S., & Rahman, F. M. (2023). The Influence of Perceived Usefulness and perceived ease of use on behavioral intention on Brimo application users in Bengkulu city. *Journal of Economics, Finance and Management Studies*, *06*(12). https://doi.org/10.47191/jefms/v6-i12-18

Renaldy, M., & Susilowati, C. (2024). Pengaruh perceived usefulness, perceived ease of use, dan trust terhadap purchase decision. *Jurnal Manajemen Pemasaran Dan Perilaku Konsumen*, *3*(1), 216–228. https://doi.org/10.21776/jmppk.2024.03.1.22

Rubia, J. M. D. L. (2019). Revisión de los criterios para validez convergente estimada a través de la Varianza Media Extraída. *Psychologia*, *13*(2), 25–41. https://doi.org/10.21500/19002386.4119

Salama, R., Al-Turjman, F., & Altrjman, C. (2023). Mobile application system for online surveys and questionnaires. *2023 International Conference on Mechatronics, IoT and Industrial Informatics (ICMIII)*, 1–10. https://doi.org/10.1109/ICMIII58949.2023.00006

Salim, A., Syafri, & Nasrullah. (2024). Accelerating sustainability environment: Understanding electric vehicles (EVs) adoption with expanded technology acceptance model (TAM). *International Journal on Advanced Science, Engineering and Information Technology*, *14*(2), 629–640. https://doi.org/10.18517/ijaseit.14.2.19996

Shaliha, A. I. P., & Marsasi, E. G. (2024). The influence of attitude and perceived risk to optimize intention to adopt based on theory of planned behavior in generation Z. *EKOMBIS REVIEW: Jurnal Ilmiah Ekonomi Dan Bisnis*, *12*(2), 1679–1694. https://doi.org/10.37676/ekombis.v12i2.5427

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, *46*(2), 186–204. https://doi.org/10.1287/mnsc.46.2.186.11926

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*(3), 425. https://doi.org/10.2307/30036540

Vishwakarma, P. (2024). Investigating consumers' adoption of electric vehicles: a perceived value-based perspective. *Marketing Intelligence & Planning*, *42*(6), 1028–1051. https://doi.org/10.1108/MIP-05-2023-0228

Vithayathil, A. (2023). Charging Forward: Investigating Consumer Attitudes and Perceptions on Electric Vehicles. *INTERANTIONAL JOURNAL OF SCIENTIFIC RESEARCH IN ENGINEERING AND MANAGEMENT*, *07*(03). https://doi.org/10.55041/IJSREM18415

von Böhlen, R., & Šimberová, I. (2023). Analysis of factors influencing car purchases on the Internet by automotive customers in Germany. *Entrepreneurship and Sustainability Issues*, *10*(3), 340–361. https://doi.org/10.9770/jesi.2023.10.3(23)

Wang, Q., Zhu, X., Wang, M., Zhou, F., & Cheng, S. (2023). A theoretical model of factors influencing online consumer purchasing behavior through electronic word of mouth data

mining and analysis. *PLOS ONE*, *18*(5), e0286034. https://doi.org/10.1371/journal.pone.0286034

Wang, S. (2023). Analyze the phenomenon of perceived ease-of-use and perceived usefulness for consumers' purchase intention. *BCP Business & Management*, *39*, 204–213. https://doi.org/10.54691/bcpbm.v39i.4064

Wang, Z.-X., Chee, W. M., Zhang, Q., & Wang, L. (2024). An extended theory of planned behaviour for explaining Chinese domestic electric vehicle purchasing behaviour. *International Journal of Humanities, Management and Social Science (IJ-HuMaSS)*, *7*(1), 11–22. https://doi.org/10.36079/lamintang.ij-humass-0701.638

Xue, Y., Zhang, Y., Wang, Z., Tian, S., Xiong, Q., & Li, L. Q. (2023). Effects of incentive policies on the purchase intention of electric vehicles in China: Psychosocial value and family ownership. *Energy Policy*, *181*, 113732. https://doi.org/10.1016/j.enpol.2023.113732

Zainol Alam, M. Z., Ahmad Agin, N. H., Suhaimi, S. A., Ayub, N., Nor, A. M., S. Kasavan, & N. E. A. B. Mohamad, Z. M. S. F. A. G. & N. I. N. R. (2023). Analysis of perceived usefulness and ease of use on online shopping intention. In A. H. Jaaffar, S. Buniamin, N. R. A. Rahman, N. S. Othman, N. Mohammad, S. Kasavan, N. E. A. B. Mohamad, Z. M. Saad, F. A. Ghani, & N. I. N. Redzuan (Eds.), *Accelerating Transformation towards Sustainable and Resilient Business: Lessons Learned from the COVID-19 Crisis. European Proceedings of Finance and Economics* (pp. 453–461). European Publisher. https://doi.org/10.15405/epfe.23081.39

Zhang, X., & Zhao, C. (2023). Resale value guaranteed strategy, information sharing and electric vehicles adoption. *Annals of Operations Research*, *329*(1), 603–617. https://doi.org/10.1007/s10479-020-03901-4

Zhao, Z. (2024). How e-commerce development affects urban carbon emissions: Evidence from China. *Highlights in Business, Economics and Management*, *41*, 597–612. https://doi.org/10.54097/9mpzyj08