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BRIDGING THE GREEN COGNITION-BEHAVIOR GAP: THE ROLE OF ENVIRONMENTAL KNOWLEDGE, DIGITAL LITERACY, AND SOCIOECONOMIC FACTORS IN BATTERY ELECTRIC VEHICLES (BEV) ADOPTION IN CHINA

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Battery electric vehicles, China, information literacy, problem-solving, safety

Abstract

Battery electric vehicles (BEVs) are currently perceived as one of the most important solutions in terms of limiting environmental impact, but there is a wide chasm between concern and adoption behavior. This research seeks to analyze the impact of environmental concern on the uptake of BEV in China by evaluating mediating variables like information literacy, safety and problem-solving abilities, and moderating effects of consumer knowledge and socioeconomic status. A sample of BEV buyers was surveyed with a formatted questionnaire. The results demonstrate that information literacy, safety, and problem-solving have a robust mediating effect on the association between environmental concern and BEV adoption, whereas consumer knowledge reinforces this connection. Socioeconomic status, however, does not indicate a moderating effect. In a practical sense, these findings underscore the necessity to improve consumer education, stimulate better access to reliable information about BEVs, resolve the perceptions of safety, and build problem-solving skills. When combined with supportive infrastructure, such initiatives have the potential to transform environmental concern into actual action in the form of environmentally friendly purchasing, speeding up the shift towards sustainable mobility, and supporting further environmentally related goals in Chinese society.

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Introduction

Recent studies have shown that the creation of a culture that includes ethical values at all levels of higher education is central to maintaining academic integrity (Bretag & Mahmud, 2016; Gow, 2014; Morris & Carroll, 2016). Scholars such as Morris and Carroll (2016) con- tend that the greatest impact

on student's behaviour is achieved if a culture of academic integ- rity is fostered through practical experiences in a supportive learning environment. This is within a learning environment that holistically addresses unethical practices and is relevant to the local context. While some research has explored institutional and national cultures and practices that are detrimental to academic integrity (e.g. Kutieleh & Adiningrum, 2011), these studies have focussed on international students in western contexts. Little to date has

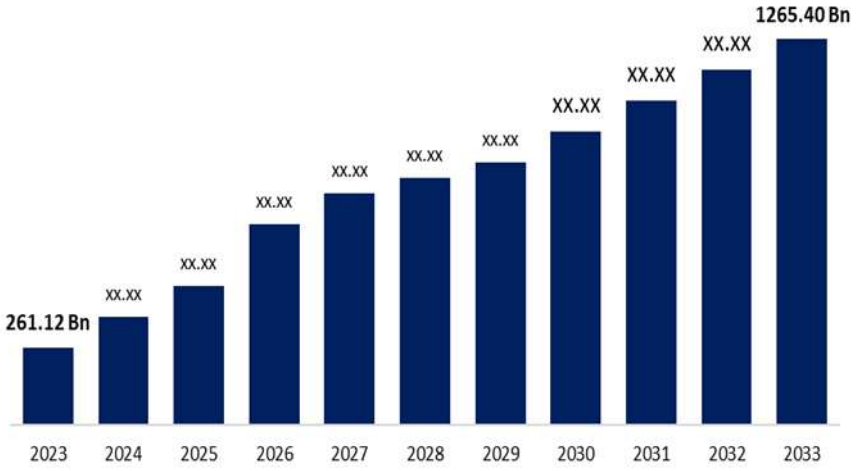


Figure 1. Forecasted growth of China's BEV market

The environmental concern (EC) over climate change has forced global economies to develop and implement alternative technologies to combat greenhouse gas (GHG) emissions from vehicles. BEVs are considered to be an eco-friendly alternative, which has the potential to promote a "sustainable transportation system" (Pamidimukkala et al., 2023). Contrarily, Lampo et al. (2025) stated that EC might not be enough to influence the adoption of BEVs, emphasising the role of technology in influencing the acceptance of BEVs. According to Almansour (2022), the adoption of BEVs by consumers is largely influenced by financial considerations, EC, and digital features. Therefore, emphasis has been given on effective digital literacy (DL) to enhance the adoption of eco-friendly alternatives such as BEVs. Arpaci et al. (2024) have also stated that green purchase intentions of consumers are largely impacted by DL, EC, and social responsibility. According to Ben Ghrbeia and Alzubi (2024), DL largely influences digital readiness and transformation. Within this context, the main dimensions of DL include "safety (SF), information literacy (IL), and problem-solving (PS)." Consequently, the development of a better digital transformation through a higher DL is essential to promote BEVs. Previous literature on how DL affects digital readiness restricts its interpretation in the context of adopting BEVs. Therefore, this research has succeeded in shedding light on the mediating role of DL on the relationship between environmental concern and BEV adoption.

Despite supporting the adoption of BEVs, various obstacles are also seen in this context alongside various environment-related factors. Some of these obstacles are the price of batteries and EVs (Moeletsi, 2021). Other factors that have been identified to influence the uptake of BEVs have also been identified in previous studies (Xue et al., 2021). These aspects are socio-economic status (SES), incentives, and policies. Next to these considerations, consumer knowledge (KN) of EVs is viewed to be critical in influencing adoption or intention to use BEVs (INT). Nonetheless, existing studies have concentrated exclusively on consumers KN toward BEVs in the context of conforming to environmental consciousness, reflecting on discussing its importance to enhance technological knowledge (Rafiq et al., 2023). Hence, KN moderation has been found to influence adoption or intention to use BEVs in this research.

The objectives of this study include (a) to study the impact of EC on adoption of EV, (b) to evaluate the mediation of DL (IL, SF and PS) in relationship between EC and adoption of EV and (c) to determine the moderation of SES and KN for EV, in association between EC and adoption of EV.

Objective

This study contributes to BEV adoption literature, emphasising the integration of DL. Moreover, the findings of this study have also highlighted the role of SES and consumers' KN in influencing BEV adoption among the eco-friendly consumers. Therefore, this study can also encourage different BEV companies to take important measures to improve DL regarding BEVs. This can help consumers understand the pros and cons of buying BEVs in today's sustainable environment.

Literature Review

Theoretical underpinnings

According to the "theory of planned behavior" (TPB), the behavioral intentions of an individual are influenced by perceived behavioral control, subjective norms, and attitude (Acikgoz et al., 2023). Therefore, this theory can be used for determining the consumers' intentions towards BEV adoption. According to Yeğin and Ikram (2022), different factors such as maintenance, range, and cost influence the consumers' intentions towards BEV adoption. Other studies have also highlighted different factors in this regard, which include community stimulus, mobility conditions, socio-economic status, and psychological perceptions. Besides these factors, enhanced EC among individuals has also contributed to the increased adoption of BEVs to promote environmental sustainability. According to Al-Ghaili et al. (2022), BEVs are an effective alternative for vehicles (which produce large GHG emissions). This has influenced many eco-friendly consumers to adopt BEVs to contribute to environmental sustainability. Past research has also shown that SES plays a crucial role in influencing the consumers' attitudes towards the adoption of BEVs (Singh et al., 2023). Therefore, TPB has been considered for determining the association between EC and BEV adoption, along with the moderation of KN and SES. Furthermore, the resource-based view (RBV) states that a firm can leverage its internal skills/ resources to gain a competitive advantage (CA) in the contemporary digital world (Khanra et al., 2022). Such resources/ capabilities can be utilized knowledgeably to attain sustainable CA. Consequently, DL and digital technology are important in the BEV sector to achieve CA (Civelek et al., 2023). It also contributes to the development of knowledge levels among consumers about the benefits and effects of BEVs on the environment. Therefore, RBV is used to assess the mediating effect of DL in the relationship between EC and BEV adoption.

Impact of EC on BEV adoption

Within recent years, people have developed awareness of environmental concerns and are motivated to purchase environmentally friendly goods. It has also led to a broader uptake of BEV. Previous studies have also examined common attitudes towards EV buying (Sukma et al., 2023). Several variables with respect to this were considered, and these include EC, government policies, attitude, and behavioral control. These aspects were identified as influencing the purchase intentions of consumers towards BEVs in a substantial way. The primary factors contributing to the adoption of BEVs were identified as government policies and EC (Yang et al., 2022). Meanwhile, the core approach to improving BEV adoption is assisted by subjective norms, improved environmental awareness, and control behavior.

BEVs are viewed as contributing to mitigating environmental issues, including environmental pollution and the elevated emission of fossil fuels (Pamidimukkala et al., 2024). Although different measures are being taken by the government to promote BEVs, their market penetration remains limited due to different social and economic barriers. Another study by Dutta and Hwang (2021), showed that different policymakers and governments are taking important measures to improve sustainable consumption among consumers, especially in the transportation sector. Based on the conducted literature review, the

following hypothesis is tested for this study:
H1: EC significantly influences BEV adoption

Mediation of DL

In today's digital era, the integration of digital technology has rapidly increased in the BEV industry. As a result, emphasis is given on the incorporation of DL. According to Grgurevic et al. (2022), DL is crucial for developing important PS skills among individuals, allowing them to obtain significant outcomes. Previous studies have indicated that DL has emerged as one of the primary work competencies and capabilities in the contemporary digital business landscape (Reddy et al., 2023). DL is also viewed as having a critical role in sustainable mobility monitoring. This strategy also plays an important part in promoting the inclusion of IL in digital transformation. Cahyani et al. (2022) argue that IL plays a crucial role in assisting people to remain safe when utilizing digital technology. As such, viable DL is critical in improving consumer uptake of BEV.

Previous studies have also highlighted the SF of consumers in the adoption of BEVs (Ariwibowo et al., 2024). To this end, the incorporation of effective DL is deemed necessary. It gives consumers a clearer idea of what technology is being installed in BEVs. Based on this discussion, the following hypotheses will be tested:

H2: Information Literacy (IL) as Mediator (H2: IL has a significant mediation in the association between EC and BEV adoption.

- Null Hypothesis (H_{02}): Information literacy does not significantly mediate the relationship between environmental concern (EC) and BEV adoption.

H3: Socioeconomic Factors (SF) as Mediator (H3: SF has a significant mediation in the association between EC and BEV adoption.

- Null Hypothesis (H_{03}): Socioeconomic factors do not significantly mediate the relationship between environmental concern (EC) and BEV adoption.

H4: Perceived Sustainability (PS) as Mediator (H4: PS has a significant mediation in the association between EC and BEV adoption)

- Null Hypothesis (H_{04}): Perceived sustainability does not significantly mediate the relationship between environmental concern (EC) and BEV adoption.

Moderation of SES

It is essential to understand the different challenges which are faced by consumers for adopting new technology. Similarly, different challenges are observed for BEV adoption. The main observed challenges in this regard include resistance to change and the diverse socio-economic status of the consumers (Singh et al., 2023). Another past study by Nielsen et al. (2021), showed that individual with higher SES are likely to influence energy-driven GHG emissions via their consumption attitudes. In contrast, their social and financial resources are found to have an indirect impact. However, a few mitigation initiatives have been taken to reduce climate change by targeting this population. Therefore, the present study has been effective in determining the moderating role of SES within the context of BEV adoption.

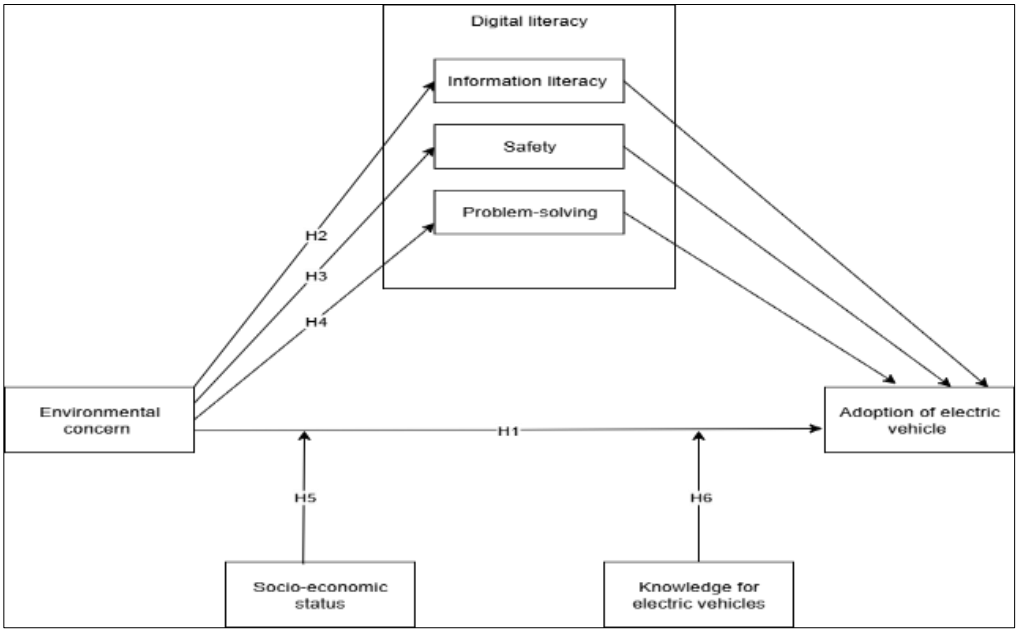
Past research has also shown that SES plays a crucial role in influencing the purchase intentions of consumers while buying a BEV (Xue et al., 2021). In this regard, charger density, income, and tax reduction are considered to have a significant impact on EV penetration. Therefore, the government needs to focus on maintaining tax incentives to ensure effective BEV adoption by consumers. This study has also tested the moderation of SES, as stated below:

H5: SES moderates the association between EC and BEV adoption.

Moderation of KN

Consumer KN is considered to be vital in influencing BEV adoption. According to Huang et al. (2021), technological KN among the consumers significantly impacts their intentions to utilize BEV and the perceived usefulness of BEV. Another study by Ivanova and Moreira (2023) emphasised investigating consumer KN to increase BEV adoption for promoting environmental sustainability. In this regard, BEV characteristics, consumers' characteristics, and BEV-related policies are considered to play a crucial role. Abbasi et al. (2021a) have also presented a significant association between social influence, perceived environmental KN, effort expectancy, and purchase intention towards BEV. Such studies emphasise the integration of effective marketing strategies to improve consumer KN regarding BEV adoption. Therefore, the following hypothesis has been tested for this research:

H6: Consumer knowledge moderates the association between EC and BEV adoption.



Methodology

A positivist philosophy is applied in this study to determine the impact of EC on the adoption of BEVs. This supported the implication of the quantitative research method. Statistical data was collected via an online survey method, and hypothesis testing was performed.

Study site, sampling, and data collection

In this study, the online survey was conducted within the context of the BEV industry in China. This industry largely contributes to the Chinese economy. The revenue of China's BEV market is forecasted to reach USD 377.4 billion by 2025 (Statista, 2025). This makes it an essential industry for China's growth. Therefore, as the current study focuses on determining the mediation DL in the relationship between EC and BEVs adoption, the consumers of BEVs have been considered as the study population. The forecasted revenue of the BEV industry shows promising growth in the BEV market (SI, 2024). Moreover, persistently increasing sustainability awareness has also encouraged many eco-friendly consumers to purchase BEVs. This can help them contribute to environmental sustainability.

Therefore, purposive sampling (Andrade, 2021) was applied to select an efficient sample for this study. For this purpose, inclusion and exclusion criteria (Table 1) were formulated for selecting the participants. Finally, based on these criteria, 281 participants were selected for data collection.

Table 1. Inclusion and Exclusion Criteria

Inclusion criteria	Exclusion criteria
All individuals who have bought a BEV.	Individuals who haven't bought a BEV.
All individuals above 18 years old.	Individuals who are below 18 years old.
Individuals who are eco-friendly consumers.	Individuals who are not able to buy eco-friendly products.
Individuals with a high DL rate.	Individuals with a low DL rate.

Measurement of Constructs

To ensure the validity of the content, the constructs for the questionnaire were adopted from already existing literature. This helped in providing an efficient foundation for analyzing the main variables within the context of BEV adoption. The initial

Findings

After completing the data collection, the "partial least squares structural equation modeling (PLS-SEM) tool" was used for analyzing the association between variables. According to Purwanto and Sudargini (2021), PLS-SEM is considered to be effective in handling complex models, making it suitable for the present study. Additionally, "The heterotrait-monotrait ratio of correlations (HTMT)" was also performed to analyze the discriminant validity within the SEM (Roemer et al., 2021).

Analysis

Table 2. Measurement Model Assessment

Constructs	**Indicators**	**Outer loadings**	**Alpha**	**Rho A**	**Composite Reliability (CR)**	**Average Variance Extracted (AVE)**
Environmental concerns VIF= 1.604	EC1	0.775	0.786	0.801	0.875	0.701
	EC2	0.885				
	EC3	0.849				
Information literacy VIF= 1.208	IL1	0.875	0.883	0.905	0.927	0.810
	IL2	0.898				
	IL3	0.926				
Intentions to use VIF= 1.00	INT1	0.825	0.910	0.911	0.933	0.735
	INT2	0.873				
	INT3	0.838				
	INT4	0.884				
	INT5	0.864				
Knowledge VIF= 1.483	KN1	0.858	0.937	0.946	0.952	0.799
	KN2	0.905				
	KN3	0.884				
	KN4	0.913				
	KN5	0.909				
Problem-	PS1	0.848	0.837	0.843	0.891	0.673

solving literacy VIF= 1.592	PS2	0.853				
	PS3	0.828				
	PS4	0.748				
Socio-economic factors VIF= 1.208	SES1	0.871	0.906	0.911	0.934	0.780
	SES2	0.895				
	SES3	0.870				
	SES4	0.896				
Safety VIF= 1.508	SF1	0.856	0.906	0.911	0.934	0.780
	SF2	0.900				
	SF3	0.896				
	SF4	0.880				

Table 2 presents the measurement model assessment for the study examining BEV adoption in China, encompassing constructs such as EC, IL, the adoption of BEV (INT), KN, PS, SES, and SF. All constructs demonstrated adequate reliability, with Cronbach's alpha ranging from 0.786 (EC) to 0.937 (KN), indicating strong internal consistency. Rho A values ranged from 0.801 (EC) to 0.946 (KN), further confirming construct reliability. CR values were all above the recommended threshold of 0.7 (Cheung et al., 2024), ranging between 0.875 (EC) and 0.952 (KN), indicating high composite reliability. AVE values exceeded the 0.5 threshold for all constructs (Haji-Othman & Yusuff, 2022), varying from 0.673 (PS) to 0.810 (IL), confirming convergent validity. Outer loadings for all indicators were above the 0.7 threshold (Aburumman et al., 2022), ranging from 0.748 (PS4) to 0.926 (IL3), supporting indicator reliability. Multicollinearity was assessed using VIF values, which were all below 5 (Tannady et al., 2022), ranging from 1.00 (INT) to 1.592 (PS), indicating the absence of multicollinearity issues. EC showed outer loadings of 0.775-0.885, IL indicators loaded strongly between 0.875-0.926, and INT ranged from 0.825-0.884. KN indicators exhibited high loadings from 0.858-0.913, PS from 0.748-0.853, SES from 0.870-0.896, and SF from 0.856-0.900. The findings can be seen in the table above.
Thus, these findings reveal that each construct passes the set thresholds regarding reliability, convergent validity, and multicollinearity, and their measurement model is robust enough to be analyzed in the structural model. The strength of their reliability and validity means that EC, IL, PS, SES, SF, and KN are adequately operationalized and can be reliably used to elucidate differences in INT of BEV adoption among consumers in China, thereby supporting the research framework. In summation, the measurement assessment shows that the model is statistically acceptable with every construct exceeding acceptable standards in outer loadings, and thus, the structural relationships can be tested.

Table 3 presents the HTMT ratios to assess discriminant validity among the constructs EC, INL, INT, KN, PS, SES, and SF. All HTMT values are below the recommended threshold of 0.85, indicating adequate discriminant validity (Rasoolimanesh, 2022). The highest ratio is observed between PS and INT at 0.688, followed by PS and EC at 0.644, both well below the cutoff, confirming that constructs are distinct. INT shows moderate associations with EC (0.590) and SF (0.579), while KN demonstrates the lowest correlations with other constructs, ranging from 0.057 (INL) to 0.261 (INT), indicating clear discriminant separation. SES correlations are minimal, with values between 0.069 and 0.393, further supporting construct uniqueness. Thus, all constructs satisfy the HTMT threshold criteria, confirming that EC, INL, INT, KN, PS, SES, and SF are empirically distinct and suitable for subsequent structural model testing, ensuring reliability of inter-construct relationships. The following table presents these findings:

Table 3. HTMT Ratio

	EC	INL	INT	KN	PS	SES	SF
EC							
INL	0.334						
INT	0.590	0.433					
KN	0.250	0.057	0.261				
PS	0.644	0.386	0.688	0.231			
SES	0.262	0.069	0.211	0.393	0.220		
SF	0.571	0.348	0.579	0.274	0.535	0.154	

Table 4 presents the structural model assessment examining the direct, mediating, and moderating effects on INT for the adoption of BEVs. H1, testing the direct effect of EC on INT, yielded a significant positive β of 0.154 ($t = 2.646$, $p = 0.008$), indicating EC significantly influences INT, with a small effect size ($f^2 = 0.030$), supporting H1. The threshold for significance was set at $t \geq 1.96$ and $p < 0.05$ (Borg et al., 2023). Mediation analysis shows that INL significantly mediates the EC-INT relationship ($\beta = 0.051$, $t = 3.130$, $p = 0.002$, $f^2 = 0.030$), confirming H2. SF also mediates EC-INT with a stronger effect ($\beta = 0.103$, $t = 3.785$, $p < 0.05$, $f^2 = 0.388$), and PS demonstrates a robust mediation ($\beta = 0.182$, $t = 6.019$, $p < 0.05$, $f^2 = 0.307$), supporting H3 and H4.

Moderation results indicate KN positively moderates the EC-INT association ($\beta = 0.132$, $t = 2.730$, $p = 0.007$, $f^2 = 0.028$), supporting H6, while SES moderation was not significant ($\beta = -0.076$, $t = 1.587$, $p = 0.113$, $f^2 = 0.009$), leading to H5 rejection. The model explains 50.1% of the variance in INT ($R^2INT = 0.501$) and demonstrates adequate predictive relevance ($Q^2INT = 0.262$). Model fit indices are within acceptable thresholds, with SRMR = 0.081 (<0.08-0.1) indicating good fit and NFI = 0.864 showing acceptable comparative fit (Sappok et al., 2025). All t-statistics for significant paths exceed the 1.96 threshold at 5% significance, confirming hypothesis validity. Thus, structural assessment confirms EC directly affects INT, and INL, SF, and PS serve as significant mediators, with KN enhancing EC's effect, whereas SES has no moderating influence, validating the conceptual framework and offering insights into drivers of BEV adoption in the Chinese context. The findings can be seen in the table below:

Table 4. Structural Model Assessment

Effects	Relationship	β	T statistics	Sig	F2	Decision
Direct						
H1	EC -> INT	0.154	2.646	0.008	0.030	Supported
Mediation						
	EC -> INL -> INT	0.051	3.130	0.002	0.030	Supported
	EC -> SF -> INT	0.103	3.785	0.000	0.388	Supported
	EC -> PS -> INT	0.182	6.019	0.000	0.307	Supported
Interaction						
	KN x EC -> INT	0.132	2.730	0.007	0.028	Supported
	SES x EC -> INT	-0.076	1.587	0.113	0.009	Not-supported
R2INT= 0.501/Q2INT = 0.262						
SRMR: 0.081; NFI: 0.864						

Figure 3 shows that KN positively moderates the EC-INT relationship. At high KN (+1SD), the slope between EC and INT is steep, indicating a stronger influence, while at mean KN, the effect is moderate,

and at low KN (−1SD), the relationship is weak, suggesting KN amplifies EC's impact on INT.

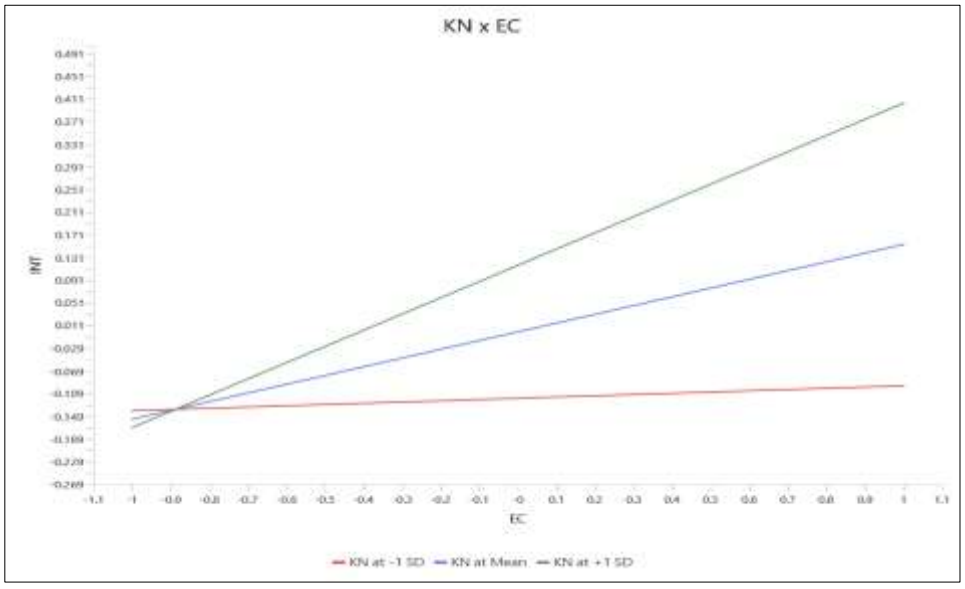


Figure 4 indicates that SES shows minimal moderating impact on the EC-INT relationship. Slopes for low, mean, and high SES are relatively close, with high SES (+1SD) only slightly enhancing INT at higher EC levels. This aligns with statistical results showing SES moderation as non-significant in the structural model.

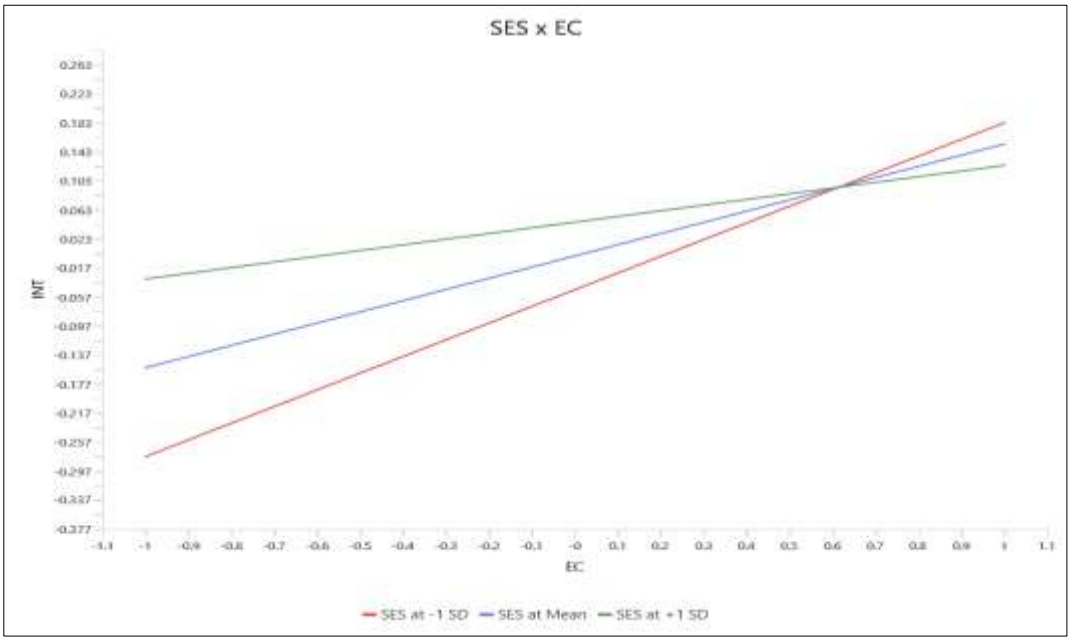


Figure 4. Moderation of SES between EC and INT

Discussion

Results show EC has a significant positive effect on INT (H1). IL, SF, and PS significantly mediate the EC-INT link (H2-H4), with SF and PS showing stronger effects. KN significantly moderates EC-INT (H6), amplifying EC's influence at higher KN levels. SES moderation (H5) is non-significant, with slopes across SES levels remaining close, indicating minimal moderating impact. Overall, EC directly

and indirectly drives INT through IL, SF and PS, while KN strengthens this relationship, and SES does not alter it.

These findings are closely allied with previous studies on battery-electric vehicle adoption. According to Li et al. (2023), environmental concern has a positive, significant influence on intention, even when accounting for attitudinal and contextual antecedents, which further supports the importance of environmental concern as an antecedent of intention. Risk and safety beliefs also operate as a key assessment filter. Jain et al. (2022) consider perceived risk and consistently find that safer appraisals increase translation of environmental concern into adoption intention, whereas risk perceptions decrease it, which is compatible with a mediation-based pathway through safety. Knowledge is introduced as a boundary condition: the higher the environmental or technology knowledge, the greater the translation of concern into intention, and vice versa. The vehicle industry has moderated models that capture this amplification and support the premise that consumer knowledge conditions the relationship between concern and intention (Hamzah & Tanwir, 2021).

Socioeconomic status findings are also similar after psychological, informational, and evaluative constructs are identified, socioeconomic factors (income, education, occupation) exhibit weak (and often inconsistent) ties to intention. Chhikara et al. (2021) stress that attitudes, perceived value, usefulness and risk are more effective in predicting the propensity of adoption than socioeconomic characteristics, which coincides with there being no moderation by socioeconomic status. Besides, Abbasi et al. (2021b) indicate that information processing ability and information literacy serve as transmission channels that translate environmental concern into a positive evaluation and intention. They demonstrate that enhanced information acquisition, understanding, and problem-solving cause elevated perceived usefulness and perceived benefits, which assume the impact of environmental concern on adoption intention.

Khan et al. (2022) emphasized that socioeconomic variables typically demonstrate limited moderating effects once psychological and informational variables are modelled because differences in access to charging and inherent infrastructure distributions drive actual adoption; socioeconomic status per se tends to demonstrate weaker direct or moderating effect on intention when involving information, perceived safety, and knowledge in models, leading to findings broadly similar to the observed lack of moderation by socioeconomic status in this study. Besides, Abudu et al. (2024) have found that technological advancements including increasing BEV range and growth in charging infrastructure, are a key component that can increase the acceptance of battery electric vehicles. These developments significantly facilitate the decarbonization of transport and align with national net-zero targets. A survey by Zhang et al. (2022) covering 858 participants in eight first and lower-tier Chinese cities has found that environmental concern, product cognition (knowledge), attitude, and subjective norms are all positive predictors of intention to adopt EVs. Nevertheless, infrastructure influenced adoption only in lower-tier cities, highlighting regional and socioeconomic disparities in adoption, even though socioeconomic status as a variable did not moderate the EC adoption relationship.

An investigation conducted by Liu and Zhang (2024) proved that the utilization of digital devices is a great way to increase the level of environmental knowledge, favourable feelings about the environment, and the willingness to behave in a manner conducive to the conservation of the environment. This shows the mediating role of digital literacy in the conversion of environmental concern into pro-environmental intentions (akin to BEV adoption). Moreover, an analysis by Jiang et al. (2023), which looked at the effects of literacy and innovation in relation to environmental pollution in China, reveals that increased literacy rates contribute to increased innovation in the long run and short run, though innovation has a positive relationship with pollution. The study further highlights that literacy (education/information) encourages innovativeness that influences the consequences of the environment, obliquely influencing the route to adoption.

Conclusion

Theory-informed understanding of Battery Electric Vehicle (BEV) adoption in China. By integrating

cognitive, informational, and resource-based perspectives, the research moves beyond traditional economic or demographic predictors and instead emphasizes the psychological and contextual mechanisms that shape pro-environmental behavior. Specifically, it foregrounds the role of environmental concern (EC) as a foundational attitudinal driver, while highlighting how mediating constructs such as information literacy (IL), perceived safety (SF) and problem-solving capacity (PS) enable individuals to translate ecological awareness into tangible adoption intentions.

The study's conceptual framework underscores the importance of equipping consumers not only with environmental knowledge but also with the digital and cognitive competencies necessary to navigate complex technological transitions. In doing so, it challenges the assumption that socioeconomic status (SES) is the primary determinant of sustainable consumption, revealing instead that behavioral intentions are more strongly influenced by informational access, perceived control, and contextual relevance. This insight has significant implications for both theory and practice, suggesting that inclusive, knowledge-driven strategies rather than income-based segmentation may be more effective in accelerating BEV adoption across diverse population groups.

As China continues its ambitious transition toward low-carbon transportation, this research provides a timely and actionable foundation for designing interventions that are both behaviorally effective and culturally attuned. Policymakers, educators, and industry stakeholders are encouraged to invest in consumer education, digital literacy programs, and safety assurance mechanisms that build trust and reduce perceived barriers. By bridging the gap between environmental cognition and sustainable action, this study offers a road map for fostering a more equitable and resilient mobility ecosystem—one that empowers individuals to make informed, confident, and environmentally responsible choices.

Implications

This study offers meaningful theoretical and practical implications for understanding BEV adoption in China. Theoretically, it enriches the Theory of Planned Behavior (TPB) by showing how environmental concern (EC) can influence adoption intentions through mediators like information literacy (IL), socioeconomic factors (SF), and perceived sustainability (PS), while also highlighting the role of knowledge (KN) as a moderator that strengthens behavioral intentions. It also extends the Resource-Based View (RBV) by framing IL, SF, and PS as intangible resources that help consumers process information, manage risks, and make informed decisions. Practically, the findings suggest that policymakers and industry stakeholders should focus on improving consumer access to BEV-related knowledge, addressing safety concerns, and offering targeted education programs. Since SES was not a significant moderator, interventions should be inclusive across income levels, with manufacturers and governments working together to build trust, promote safety certifications, and make BEVs more appealing to a broader audience. These efforts can help bridge the gap between environmental awareness and actual adoption behavior, accelerating the transition to sustainable mobility in China. The study has the following implications:

Theoretical contributions

The study presents several theoretical contributions by incorporating the TPB and the RBV theory to predict the behavior of BEV adoption in China. Based on TPB attitude (Ajzen, 1991), the results give insight into how EC can translate to adoption intentions by using mediators like IL, SF and PS, noting the influence of cognitive aspects and perceptions on behavioral outcomes. The robust moderating effect of KN contributes to the enrichment of TPB by stating that when persons have a high source of relevant knowledge, their behavioral intentions are reinforced, as they contribute to the increase in the predictive potential of the theory. As viewed through the lens of RBV (Wernerfelt, 1984), IL, SF and PS can be conceptualized as intangible resources that can be useful in helping consumers successfully process information and manage perceived risks and solve problems, and facilitate adoption decisions. Besides, the dismissal of SES as a moderator calls into question traditional beliefs that socio-economic resources are major determinants, indicating that cognitive and informational abilities could be given more

priority. In general, it contributes to both TPB and RBV by filling the gap between attitudinal, cognitive, and resource-based approaches to sustainable mobility adoption.

Practical implications

In practice, it provides valuable information to policymakers, marketers, and stakeholders in the industry, who are seeking to hasten the move to BEV in China. Since IL, SF, and PS played a substantial role as mediators, intervention efforts should be targeted at enhancing accessibility, evaluation, and utilization of BEV-related knowledge in consumers and addressing safety concerns and problem-solving impediments. Education and training programs will provide consumers with the necessary skills and motivation to make balanced choices (Saleet et al., 2023). The moderating effect of KN underscores the value of consumer education-a clear, accessible, and targeted information about BEV benefits, maintenance, and charging infrastructure can magnify the effect of EC on adoption (Ledna et al., 2022). The outcome that SES does not moderate significantly means that interventions need to focus on different socio-economic categories and make BEVs attractive to a wide range of consumers. Manufacturers can add safety promises to their product packaging and advertising, and governments can promote clear safety certification and capital upgrades. Thus, these measures have the potential to close the gap between environmental concern and buying behavior, paving the way towards a more rapid shift towards sustainable mobility solutions in China.

Limitations and future research directions

It is important to note that this research has some limitations as well. The small sample size might have compromised the statistical power of the analysis and lowered the capacity to identify subtle interactions among the variables, and therefore impacted the generalizability of the findings. Moreover, the study is not a longitudinal study, which restricts observation of changes in attitudes and behaviors over time. Besides, self-reported indicators can be prone to response bias, which can affect the quality of findings (Scott & Balthrop, 2021). In addition, the mediators and moderators that the study targeted were limited, and in the future, the research should address more psychological, technological, and policy-related mediators and moderators that can contribute to BEV uptake.

To further advance this study, future research should consider utilizing bigger and varied sample sizes to increase the generalizability of research results to other demographic and cultural settings. It is suggested to use longitudinal designs to understand how EC, IL, SF, PS, and KN vary over time, which will enable stronger causal inferences. The model can be expanded by incorporating other mediators like perceived cost, convenience of charging, and social influence, which may offer a wider knowledge of the BEV adoption. The impact of new technologies, including AI-based driving aids or battery technology inventions, on consumer perception could also be explored in future research. Cross-nation comparisons between jurisdictions characterized by different degrees of BEV market maturity may demonstrate context-related drivers and obstacles, providing policymakers and industry stakeholders with more practices to encourage the adoption of sustainable mobility.

Co-Author Contribution

The author did all the write-up with careful consideration and perform the whole article.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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