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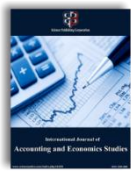

Attitude, Subjective Norm, Perceived Behavioral Control and Intention to Adopt Electric Vehicles in China

Jin Jing [1]*, Lim Kim Yew [1], Tan Owee Kowang [2], Tee Poh Kiong [3], Yang Chen [1]

[1] Faculty of Business and Communications, INTI International University, Malaysia.
[2] Faculty of Management, Universiti Teknologi Malaysia, Johor Baharu, Malaysia.
[3] Asia Pacific University of Technology & Innovation, Taman Teknologi Malaysia, Kuala Lumpur 57000, Malaysia
**Corresponding author E-mail: i24026413@student.newinti.edu.my*

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Abstract

This study utilizes the Theory of Planned Behavior (TPB) framework to examine the elements affecting Chinese consumers' intention to adopt electric vehicles (EVs). This research systematically applies TPB's core psychological variables to the EV (electric cars) adoption context in China's unique market environment. This study aims to examine the relationships between attitude, subjective norm, perceived behavioral control, and intention to adopt EVs among Chinese consumers. It makes a theoretical contribution by validating the applicability of TPB in China's cultural and market context characterized by collectivism, strong policy orientation, and price sensitivity. From a practical perspective, the investigation furnishes policymakers and marketers with valuable information to promote the advancement of more efficient strategies for EV adoption in the Chinese market. Most existing research on EV adoption has been conducted in Western contexts, with limited systematic examination of psychological dimensions in China's distinct cultural and market environment. While existing studies focus predominantly on economic and technological factors, further development of the psychological dimension and renewable energy research in the Chinese market is needed. The objective of the investigation is to address this disparity by offering empirical evidence of TPB's effectiveness in predicting Chinese consumers' intention to adopt EVs.

Keywords: *Intention to Adopt; Attitude; Subjective Norm; Perceived Behavioral Control.*

1. Introduction

Global climate change has become one of humanity's major concerns in the twenty-first century. It is estimated that around 25% of the world's CO_2 emissions come from the transportation industry. (Sheldon et al., 2022). China is one of the world's largest carbon emitters and has committed to peaking carbon emissions by 2030 and achieving carbon neutrality by 2060, making electric vehicle (EV) adoption a strategic national priority. (Zhu et al., 2023). Despite China maintaining the world's largest EV market for eight successive years since 2015, demonstrating strong performance with 6.88 million units delivered in 2022, which constituted more than 60% of the global market share, EV penetration rates remain relatively low at only 5.5% of total motor vehicles (IEA, 2022). In 2024, sales of new energy vehicles (NEVs, including battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) in China exceeded 11 million units, accounting for approximately 48% of total vehicle sales (CAAM, 2025; IEA, 2025). Entering 2025, the penetration rate of new energy vehicles has surpassed 50% in multiple months, with projected sales expected to exceed 15 million units by year-end, potentially reaching a penetration rate of 57% (IEA, 2025). In September 2025, the production and sales of new energy vehicles reached 1.617 million and 1.604 million units, respectively, representing year-on-year increases of 23.7% and 24.6% respectively (CAAM, 2025). In the first ten months of 2025, cumulative NEV sales reached approximately 12.94 million units, with the penetration rate reaching a historic 51.6% in October, which marked the first time a single month exceeded 50% (CAAM, 2025). This growth has been primarily driven by plug-in hybrid electric vehicles (PHEVs), whose market share increased from approximately 15% in 2020 to nearly 30% in 2024, substantially exceeding the growth rate of battery electric vehicles (BEVs) (IEA, 2025). Consumer preferences for extended driving range and lower initial costs have contributed to PHEV growth outpacing that of BEVs (IEA, 2025). A notable trend is the accelerating growth of PHEV sales, with PHEVs accounting for approximately 35% of total NEV sales in 2024 compared to lower proportions in previous years (CAAM, 2025). This shift reflects consumers' pragmatic preferences for dual-mode capability that mitigates range anxiety while benefiting from identical policy incentives as BEVs, including purchase tax exemptions through 2027. Furthermore, the government's new energy vehicle replacement subsidy policy, extended through 2025, provides consumers with subsidies of up to 20,000 RMB for the purchase of new energy vehicles (China Ministry of Commerce, 2025).

A comprehensive analytical framework that systematically explains the underlying mechanisms of consumer behavioral intentions, particularly focusing on how attitude, subjective norm, and perceived behavioral control (PBC) interact to shape human decision-making patterns, this framework is identified as the Theory of Planned Behavior (TPB) (Ajzen, 1991). However, existing research on intention to adopt EVs

in China predominantly focuses on economic, technological, or policy factors, with limited attention to the psychological dimensions that drive consumer behavior (Liu et al., 2017). TPB core variables' applicability and mechanisms have not been thoroughly explored in the Chinese EV market context, which is characterized by cultural uniqueness, strong policy orientation, and price sensitivity (Chu et al., 2019). Attitude toward EVs, as the fundamental psychological predictor, determines consumers' positive or negative assessment of EV adoption behavior. (Ajzen, 1991). In China's highly collectivist society, subjective norm may play a more significant role in consumer decision-making compared to Western contexts, as social pressure factors such as "face" and group identity are particularly influential. (Wang et al., 2018). Similarly, PBC represents consumers' perception of their ability to perform EV adoption behavior, which varies significantly due to real barriers such as uneven distribution of charging stations, limited technical knowledge, and high purchase costs. (Liao, 2021).
This study analyses the impact of TPB's three core variables on Chinese consumers' intention to adopt EVs, aiming to validate the applicability of this classical behavioral theory in China's specific cultural and market context.

2. Intention to Adopt

Considered to be a direct antecedent of actual conduct, intention may be seen as a measurement of someone's preparedness to participate in a specific activity (Ajzen, 1991). The intention generation process involves cognitive evaluation and social influence, creating a dynamic process that helps explain why certain individuals are more inclined to try new behaviours (Bagozzi & Dholakia, 2002; Kelman, 1958). Intention has a significant predictive effect on actual behaviour, particularly in environments with strong PBC (Ajzen, 1991; Hagger et al., 2002). Intention to adopt denotes the degree to which buyers are inclined to acquire a certain product. (Cheung et al., 2019). In the field of sustainable consumption of new technologies, adoption intention has been confirmed as an important antecedent variable for predicting actual purchase and acceptance behaviour, having a significant positive impact on consumers' final behavioural decisions. Zahan et al. (2020) Found in their study of Bangladeshi consumers' green housing purchase behaviour, green purchase behaviour among consumers was predominantly influenced by green purchase intention, which emerged as the key determining element, confirming the strong predictive role of intention on actual behavior in the sustainable building consumption field. Intention to adopt EVs is defined as the likelihood of consumers choosing to use EVs, encompassing their propensity to select EVs for travel, prioritize EV purchases, and recommend them to others. (Xu et al., 2020).
Intention to adopt EVs is crucial for addressing environmental pollution and sustainable transportation development; thus, numerous scholars have conducted in-depth research on its influencing factors. Existing research categorizes these factors into three major types. First are technological attribute factors, where purchase price constitutes the main barrier, as consumers are unwilling to pay high upfront costs. (Carley et al., 2013) Meanwhile, insufficient charging infrastructure and long charging times form another technological bottleneck. (Xu et al., 2021), while the driving range continues to be a critical factor in technological feasibility (Zhang et al., 2022). Second are policy attribute factors, where government support is particularly crucial during the initial promotion period. Research shows that financial incentives (tax exemptions) are more effective in promoting adoption than non-financial incentives (driving privileges) (Li et al., 2017). Including both demographic and psychological aspects, the third category comprises customer characteristics. Demographically, middle-aged, well-educated male technology professionals have a greater propensity to adopt EVs (Hidrue et al., 2011), though the income impact is not significant. Regarding psychological factors, research based on theories such as TAM and TPB focuses on variables like perceived risk and subjective norm. (Jansson et al., 2017), while the pro-environmental NAM model emphasizes the positive role of personal norms (He & Zhan, 2018).
The EV market in China is the biggest in the world that reaching 9.5 million units in sales in 2023, accounting for over 60% globally (IEA, 2025). However, relative to its massive overall automobile market, EV penetration still has enormous room for growth, making understanding consumer adoption mechanisms crucial for further market expansion. In the early development stage, policy-driven initiatives served as the core driving force for market adoption. Wang et al. (2016) Directed subsidies for EV purchasers were made available by the Chinese government via the implementation of the "Energy Saving and New Energy Vehicle" plan and the establishment of pilot programs. Wang et al.(2017)Found that tax exemptions, exemptions due to the value-added tax and the purchase tax, as well as exemptions from tolls, are some of the other financial incentive measures that have been implemented. According to Ma et al. (2017) A multivariate cointegration model was created with the intention of evaluating the efficacy of incentive policies. The researchers discovered the positive cointegration link between incentive policies and EV sales.
Entering the market segmentation development stage, consumer behaviour and decision-making mechanisms in different markets began to show differentiated characteristics. During this stage, social norms positively correlated with EV adoption intention, with social responsibility and identity significantly enhancing adoption intention, especially among environmentally conscious groups. (Rezvani et al., 2018). Furthermore, Tu & Yang (2019) Found that several critical determinants played pivotal roles in shaping the electric vehicle purchasing decisions among Chinese consumers, specifically encompassing resource management control, individual behavioral attitudes, the perceived functional utility of EVs, and the degree of compatibility with existing lifestyle patterns.
With the maturation of EV technology and the accumulation of market experience, consumer evaluation of EVs has become more comprehensive and rational. Wang et al. (2018) Found that perceived usefulness and adoption intention were significantly negatively affected by perceived risk. Wu et al.(2019) Extended the traditional concept of perceived usefulness to green perceived usefulness, and the study demonstrated that green perceived usefulness exerted an important and favourable consequence for both usage intention and purchase intention toward autonomous EVs. In China's post-subsidy era, as subsidies decrease, non-financial policies show stronger effects. (Liao, 2021). Han & Sun (2024) Conducted a discrete choice experiment and found that BEV consumers place greater value on driving range and vehicle-to-grid (V2G) technology, while PHEV consumers prioritize fast charging time; regarding regional differences, northern consumers prefer PHEVs' dual power systems due to climate factors, central region consumers show the highest acceptance of BEV innovative technologies, and southern consumers exhibit greater price sensitivity. Furthermore, consumers in high-penetration markets demonstrate significantly higher willingness to pay for BEV attributes compared to those in low-penetration markets, where consumers tend to favor PHEVs as transitional vehicles. Cong et al. (2023) Investigated Chinese consumers' EV purchasing decisions were examined in terms of how they are influenced by attitudes, subjective norm, and PBC. It was demonstrated that subjective norm emerged as the most dominant factor affecting these behavioral intentions. To the contrary, Zheng et al.(2025) Found that attitude and PBC significantly and beneficially impacted Chinese consumers' EV purchase intentions, while subjective norm showed no significant effect. Xie et al. (2025) investigated online EV purchasing behavior using the TPB framework and a PLS-SEM analysis of 1,000 consumers from Beijing, Shanghai, and Shenzhen. The study found that government policies significantly strengthen the relationship between purchase intention and actual behavior, highlighting the crucial role of subsidies, tax benefits, and charging infrastructure in facilitating behavioral conversion.

Although existing research has explored psychological factors, their interaction mechanisms, and dynamic impacts in China's post-subsidy era require further investigation. Therefore, systematic research on the psychological mechanisms of Chinese consumers' EV adoption is crucial for promoting sustainable development in the world's largest market.

Recent studies highlight that the adoption of EVs is also influenced by broader financial and environmental mechanisms. Fintech-enabled green financing tools, such as green loans and digital credit scoring, have been shown to significantly impact consumers' purchasing decisions (Liu & You, 2023). Furthermore, environmental, social, and governance (ESG) performance increasingly contributes to the brand equity of EV companies and shapes consumer attitudes (Huang et al., 2025). Environmental economics research has also emphasized rebound effects, suggesting that lower operating costs may increase driving frequency, thereby partially offsetting environmental gains (Wang et al., 2024).

3. Attitude

Within the TPB framework, "the degree to which a person has a favorable or unfavorable evaluation of the behaviour in question" is the definition of attitude (Ajzen, 1991). As research advanced, attitude became increasingly prominent in consumer behavior studies, given its critical role in explaining purchase decisions (Eagly & Chaiken, 1993). Lane & Potter (2007) Viewed attitude as an internal disposition toward energy conservation and new technologies. Moving into the EV context, Barbarossa et al. (2015) Defined attitude within the TPB framework as the total positive or negative appraisal of EVs by individuals. Han et al. (2017) Demonstrated attitude mediated a link among b non-functional values and intention to adopt EVs. Attitude is influenced by personal values as a psychological tendency, environmental motivations, and cognitive structures (Rezvani et al.,2018). More recently, Yeğin & Ikram (2022) Define attitude toward behaviour as referring to how much a person views a particular behaviour in a negative or positive way. This multidimensional conceptualization reflects the complexity of EV adoption decisions.

The importance of attitude in predicting individual behaviour cannot be overstated. As a foundational and essential component of the decision-making strategy, attitude is considered the foundation for the formation of purchase intentions (Ajzen, 1991; Eagly & Chaiken, 1993). Early empirical research established attitude's predictive power, Venkatesh & Davis (2000) Identified perceived usefulness and ease of use as core factors in forming positive attitudes towards new technologies. Green self-identity influences attitudes towards EVs, with this effect varying across cultural contexts (Barbarossa et al.,2015). Attitude mediated the impact of perceived risk on purchase intentions. Xu et al. (2019) Confirmed research has shown that attitude directly influences consumers' readiness to adopt EVs (He et al., 2018). Liu et al. (2020) Demonstrated that driving experience positively impacted attitudes toward various aspects of EVs, including battery life, driving range, and economic benefits. Dutta & Hwang (2021) Found that environmental concern positively influenced Taiwanese consumers' attitudes towards EVs. In their comprehensive study, Wang et al. (2021) Demonstrated that face-consciousness and social norms served as pivotal elements in determining consumer perceptions of BEVs within a distinctive Chinese cultural framework.

The influence of attitude on EV adoption intention shows differentiated characteristics across different markets. In mature markets, most studies support a positive relationship. Tanuwijaya & Balqiah (2022) Found that attitude had a significant positive influence on purchase intention among 826 Jakarta respondents, with attitude being the factor with the largest total effect, having both direct and indirect influence. Solekah et al. (2023) Established that positive consumer perceptions of EVs effectively promote their intention to make environmentally conscious purchases among East Java consumers. Riverso et al. (2023) Revealed that attitude exerted a significant positive influence on BEV purchase intention among Italian participants. However, contradictory findings emerged; Cong et al. (2023) revealed that attitude's influence on purchase desire was non-significant in both Korean and Chinese countries. Similarly, findings revealed that attitude does not significantly affect consumers' intention to purchase EVs among Indian consumers (Rafiq et al.,2024). Darma & Padmantyo (2025) Demonstrated a significant positive association between attitude and EV adoption intention among Indonesian respondents.

Despite these international variations, recent Chinese market research consistently supports the positive relationship. Consumer knowledge levels positively impacted attitudes, while financial incentive policies without no direct impact on adoption intentions (Wang et al.,2018). Liao (2022) Confirmed the significant positive influence of attitude in a study conducted during the post-subsidy period in the cities of Beijing, Shanghai, and Shenzhen. He et al. (2023) Findings revealed that attitude exhibited the most significant positive impact on EV purchase intention among 423 Chinese consumers. Ji et al. (2024) investigated 867 Chinese consumers' responses to EV adoption. The findings revealed that attitudes significantly predicted purchase intention, while personal norms emerged as the strongest predictor of purchase intention, indicating that moral obligations constitute a key motivational force underlying Chinese consumers' new energy vehicle purchase decisions. Wang et al. (2024) employed an extended TPB framework to investigate the impact of perceived value and consumer ethnocentrism on domestic EV purchasing behaviour through a survey of 380 potential consumers in Xuzhou, China. The findings revealed that attitude exerted the strongest influence on purchase intention, surpassing subjective norm and PBC, with attitude serving as a partial mediator between subjective norm and purchase intention. Perceived value demonstrated the most significant impact on attitude, while consumer ethnocentrism also positively influenced attitude. Zheng et al. (2025) investigated 379 potential EV consumers across six major Chinese cities' responses to EV adoption. The findings revealed that attitude significantly predicted purchase intention, while brand association, perceived quality, and brand loyalty shaped consumer attitudes and partially mediated their effects on purchase intention. Critically, perceived price emerged as a significant negative moderator, indicating that price sensitivity constitutes a key boundary condition that either amplifies or attenuates the conversion of favorable attitudes into actual purchase commitment in the Chinese EV market.

While empirical evidence remains inconsistent, mainstream literature and theoretical expectations still support attitude's significant effect on intention to adopt EVs, specifically in the market of China, where the meaningful contribution of intrinsic attitude evaluation is increasingly prominent. Therefore, the research proposes the hypothesis articulated below:

H1: Attitude has a significant influence on intention to adopt electric vehicles in China.

4. Subjective Norm

Subjective norm takes note of the phenomenon in which individuals modify their behaviour in accordance with social and cultural expectations (Bharti et al., 2024). Ajzen (1991) explained that, as the second core construct of TPB, subjective norm reflects the social pressure perceived by individuals either to participate in a certain conduct or to avoid participating in that behavior. Ajzen & Fishbein (1975). This concept originates in the year of 1970s from the Theory of Reasoned Action, where researchers propose that behavioral intention was shaped by the combination of attitude and subjective norm. These beliefs from one's contemporaries, relatives, or friends have a significant impact on one's conduct, regardless of whether individuals personally endorse these beliefs at an individual level. Prior investigations have empirically demonstrated that an individual's propensity for environmental action is associated with the positive influence of social norms

(Madrigal, 2001). Adnan et al. (2018) defined subjective norm as the pressure individuals feel to be present from necessary teams regarding whether to purchase EVs. Tu & Yang (2019) further distinguished that subjective norm encompasses interpersonal influence (from family and friends) and external influence (from mass media, expert opinions, and government policies).

The mechanism by which social pressure influences EV adoption decisions varies across cultural contexts. In collectivistic cultures, subjective norm exerts a stronger influence on behavioral intention than in individualistic Western contexts (Wang et al., 2018). Tanuwijaya & Balqiah (2022) Verified that purchase intention was significantly and positively affected by subjective norm among 826 respondents in Jakarta. Darma & Padmantyo (2025) Demonstrated that subjective norm did not have any impact on intention to adopt EVs in Indonesia.

Focusing on the Chinese market, subjective norm exhibits unique and complex patterns of influence. Tu & Yang (2019) found that external influence (expert opinions, authoritative endorsement) played a stronger role than interpersonal influence in Chinese EV adoption decisions, reflecting Chinese consumers' greater reliance on professional knowledge rather than personal experience. The government has effectively shaped consumers' subjective norm perceptions through media campaigns and public education. Xu et al. (2019) Found consumers in Zhejiang Province that the second most promising indicator of the intention to buy an electric car was subjective norm (standardized importance 84.69%), second only to PBC.

Wang et al. (2021) Demonstrated that a distinctively Chinese cultural factor was the face consciousness, which had a significant influence on consumers' subjective norm perceptions regarding EVs. The Chinese government's information dissemination policies have promoted EV adoption by influencing consumers' subjective norm. Zheng et al. (2022) Validated the pathway "from subjective norm to behavioral intention and ultimately affecting willingness to pay" through 498 questionnaires. Social pressure from significant others serves as a key factor driving consumers to form EV purchase intentions. Cong et al. (2023) explained the purchase desire of consumers within the Chinese market was found to be significantly and positively influenced by subjective norm, indicating that EV purchase decisions of the customer service in Chinese individuals are influenced by the ideas of family and friends as well as media advertising. Personal desire represents the primary driving force behind purchase intention, serving as the predominant influence in customer decision-making processes. Conversely, subjective norm operates through an indirect pathway, where it first influences personal purchase desire, which subsequently affects overall purchase intention. Ehsan et al. (2024) employed an extended TPB framework to investigate Chinese consumers' intentions toward EV adoption. Subjective norm has a significant positive impact on Shanghai consumers' intention to purchase EVs, ranking second in influence after personal attitude. The study found that social pressure mechanisms, including influences from family and friends as well as government encouragement policies, significantly affected consumer decision-making. Empirical results demonstrated that reference group policies (such as free parking and traffic restriction exemptions) were more effective in promoting purchase intentions compared to fiscal incentives (such as subsidies and tax reductions). DeJun et al. (2025) Integrated the TPB with Value-Belief-Norm theory to examine the impact of social media on green EV purchase intentions among consumers in Shanghai. The findings revealed that social media served as a complete mediator between subjective norms and purchase intentions, primarily influencing purchasing decisions by shaping individuals' perceptions of social expectations. The study confirmed that subjective norms have a significant positive impact on green purchase intentions, highlighting the crucial mediating role of subjective norms in the social media environment. Liu & Selamat (2025) Applied TPB, consumer behavior theory, and government intervention theory to analyze 351 EV consumers in Shandong Province. Their results show that subjective norm positively influences purchase behavior by validating the role of social pressure and significant others' expectations, though with weaker effects than incentive policies. The study emphasizes that subjective norms promote purchase behavior through environmental responsibility and social identification. Importantly, Chinese "face" culture significantly moderates consumer decisions, leading the authors to recommend experiential marketing and premium brand building to enhance subjective norms' positive effects.

Despite divergent empirical findings, the theoretical foundation and majority of studies continue to support the important function of subjective norm, within the Chinese collectivistic cultural context in particular, where government policy orientation and social expectations jointly reinforce the influence of social pressure on personal decisions. Therefore, this research proposes the hypothesis articulated below:

H2: Subjective norm has a significant influence on intention to adopt electric vehicles in China.

5. Perceived Behavioral Control

PBC originally emerged from TPB, proposed by Ajzen in 1985 and refined in 1991. Since an evolution of the Theory of Reasoned Action, Ajzen introduced PBC to explain individuals' behavioral choice process in the absence of full volitional control (Ajzen, 1991). The concept was initially defined as "an individual's perception of the ease or difficulty of performing a particular behavior, reflecting an individual's subjective assessment of internal capabilities and external conditions." As research progressed, PBC has been emphasized as playing a necessary function in advancing pro-environmental behaviors in environmental behavior studies (Bamberg & Möser, 2007).

Within the particular framework of EV adoption, PBC is more precisely defined as "the degree of confidence that consumers have in their possession of the necessary resources, capabilities, and opportunities to purchase, use, and maintain EVs." (Xu et al., 2019). Solekah et al. (2023) Conceptualize PBC as "encouragement or resistance perceived by someone to show behavior," EV purchase behavior reflected by individuals' perceived ease or challenge associated, including considerations of price affordability, maintenance capabilities, and accessibility of purchase locations.

PBC and intention demonstrate varying relationships across different market environments. Tanuwijaya & Balqiah (2022) Found through structural equation modeling analysis that significant positive effects on purchase intention were demonstrated by PBC, which was established as the most influential element among all direct influence variables. However, Solekah et al. (2023) collected data from 239 Indonesian EV users across East Java, revealing non-significant associations between PBC and green purchase intention. Darma and Padmantyo (2025) conducted a study examining 220 Indonesian respondents through a questionnaire survey using PLS-SEM methodology, with results showing a significant positive correlation confirming that perceived capability enhances adoption intentions.

Focusing on the Chinese market, PBC presents unique and complex patterns of influence. Huang & Ge (2019) found in their Beijing research that perceptions of charging infrastructure adequacy provide the most effective indicators of PBC. Participants with EV driving experience scored 28% higher on PBC than those without experience (Liu et al.,2020). Wang et al. (2021) demonstrated that face consciousness positively influences Chinese consumers' perceived control over EV adoption decisions. However, research findings show divergence. Zhang et al. (2022) found that PBC failed hypothesis validation and was subsequently removed from the model due to insufficient validity. Conversely, He et al. (2023) demonstrated PBC as a significant direct positive influence on purchase intention, with mediation analysis confirming that 56% of PBC's influence operates through partial mediation via the desire variable. He et al. (2024) found that PBC had a significant positive impact on new energy vehicle purchase intention, although its effect strength was relatively weak. Xie et al. (2025) further deepened the understanding of the mechanism through which PBC operates, focusing on Chinese consumers' online EV

purchasing behaviour. The research found that PBC had a direct impact on purchase intentions as well as exerted an indirect influence on actual purchase behavior through purchase intention as a mediating variable. Xu et al. (2025) construct a model based on the integration of TPB and the Technology Acceptance Model (TAM) and find that PBC is the most significant determinant of EV purchase intention, showing a strong effect across all regions, particularly in the western region. Attitude and subjective norm also exhibit positive effects, with a more pronounced impact in the eastern region, reflecting regional differences in technology acceptance and social recognition. Hu et al. (2025) applied an extended TPB framework to examine Chinese consumers' purchase intentions toward New Energy Vehicles. The study found that Attitudes toward NEVs emerged as the key determinant of purchase intention, while PBC showed a significant but modest effect. Environmental knowledge and environmental concern positively influenced purchase intention both directly and indirectly through the mediating role of perceived value. Notably, perceived risk negatively affected both perceived value and purchase intention, indicating that consumer concerns about safety, reliability, and costs constitute significant barriers to NEV adoption. In the context of China, many studies support a favourable association of PBC with intention to adopt EVs, where infrastructure and financial barriers are significant adoption considerations. This research proposes the hypothesis articulated below:
H3: Perceived behavioral control has a significant influence on intention to adopt electric vehicles in China.

6. Theoretical Foundation

This study employs TPB for several reasons. First, TPB functions to be an adequate theoretical structure that successfully elucidates how attitude, subjective norm, and PBC engage with the impact on individual intention of behavior, with these three core constructs jointly predicting behavioral intention, that is, attitude, subjective norm, and PBC (Ajzen, 1991). Second, TPB is considered highly effective in improving the prediction of consumer intentions toward pro-environmental behaviors, particularly in the field of EV adoption. Asadi combined TPB with the Norm Activation Model in Malaysia and reported that personal norms and perceived responsibility, along with self-interest concerns, significantly motivated EV acceptance, again confirming that moral imperatives and practical factors often converge (Asadi et al.,2021). Third, the inclusive theoretical model that has been thoroughly tested across pro-environmental behavior studies is represented by TPB. Shang et al. (2024) Validated the effectiveness in the context of green product purchase intention with the TPB framework, using a sample of 419 Chinese university students and employing SEM analysis to find that attitude, subjective norm, and PBC all had significant positive effects on green purchase intention, confirming TPB's strong explanatory and predictive power in pro-environmental consumer behaviour research.
TPB has been extensively utilized in analyzing variables influencing the behaviors of individuals adopting eco-friendly practices. Wang et al. (2018) Constructed a comprehensive framework for remanufactured product purchase intention by incorporating TPB with Stimulus-Organism-Response (SOR), finding that core TPB elements, including PBC, face consciousness, and group conformity, significantly influenced Chinese consumers' purchase intentions toward remanufactured products, confirming TPB's effectiveness in explaining sustainable consumption behavior. Qi & Ploeger (2021) Developed a comprehensive framework for integrating a modified TPB with a modified SOR model within the framework of green food purchase intention, with outcomes showing that green food purchase intention was significantly influenced by PBC, face consciousness, group conformity, as well as cognitive and emotional attitudes. Li et al. (2023) Incorporated TPB to investigate the green development behaviour mechanism of construction enterprises, surveying construction companies in China utilized attitude, subjective norm, and PBC to demonstrate significant positive effects on construction enterprises' green development behavioural intention, and findings showing that behavioural intention mediated between cognitive factors and actual behavior. TPB demonstrates strong applicability in EV adoption research. Hasan et al. (2024) Incorporated price value and environmental concern investigated EV purchase intentions with the consumers of Indian using the TPB framework, which found that environmental concern and price value positively influenced consumer attitudes, while all three core TPB variables (subjective norm, PBC, and attitude) positively influenced purchase intentions, validating the relevance of the extended TPB model. TPB similarly exhibits excellent explanatory power in the specific context of the Chinese EV market. Ji et al. (2024) Analysed EV purchase intentions based on Chinese consumer data, confirming that subjective norm, attitude, and PBC all exerted significant positive effects on purchase intentions. These studies proved that TPB is not only applicable to individual consumption decisions but can also effectively explain pro-environmental behaviors at the enterprise level. Wang & Lin(2024) Based on an extended analysis of TPB, found that PBC was the most significant factor influencing low-carbon travel behavior, followed by subjective norm and attitude, with a partial mediating effect between PBC and low-carbon travel behavior. The study, which sampled 2,167 residents from four first-tier cities in China (Beijing, Shanghai, Guangzhou, and Shenzhen), found that under the rapid adoption of NEVs, residents in these economically developed cities with well-established infrastructure had their low-carbon travel behaviors significantly influenced by the completeness of public transportation infrastructure and environmental knowledge. Jiang et al. (2025) An integrated SOR model with TPB to examine 658 EV consumers across five Chinese regions. Their findings demonstrate that while psychological factors, including attitude, subjective norms, PBC, and trust, significantly influence purchase intention, these factors exert no direct impact on actual behavior. Purchase intention functions as a full mediator between psychological factors and behavior, indicating the existence of intention-behavior conversion barriers. Notably, policy packages do not directly affect purchase intention but rather operate through indirect mechanisms involving perceived value and psychological factors, with perceived value demonstrating a substantial influence on psychological constructs. Xu et al. (2025) Constructed an analytical framework grounded in TPB and TAM to investigate the determinants of EV adoption intentions. Their findings revealed that consumers in first-tier cities, including Beijing, demonstrate a stronger propensity toward EV purchases, attributable to comprehensive infrastructure development and elevated environmental consciousness. Conversely, purchasing decisions among Western region consumers are predominantly shaped by PBC, while attitudinal factors and subjective norm emerge as primary determinants in eastern regions, highlighting geographical variations in technological receptivity and social conformity.
However, as China's EV market has rapidly evolved, particularly since 2023 with the surge in PHEV sales (accounting for approximately 35% of total NEV sales in 2024 compared to their penetration in previous years) (CAAM, 2025; IEA, 2025), the market has transitioned from subsidy-driven to consumer-driven, and empirical research findings have exhibited notable contradictions. The rise of PHEVs reflects a shift in consumer priorities: alleviating range anxiety, addressing insufficient charging infrastructure, and heightened price sensitivity (Zhu et al., 2023). This market bifurcation, coupled with regional disparities, technological advancements (battery cost reductions, extended driving range), and policy adjustments such as trade-in subsidies and purchase tax exemptions extended through 2027 (Ministry of Finance, 2024), has resulted in inconsistent relationships between TPB constructs and adoption intention across different studies (Zhang et al., 2022; Wang et al., 2024). As shown in Table 1, the significance and magnitude of effects for attitude, subjective norm, and PBC demonstrate substantial variations.

Table 1: Factors Influencing Chinese Consumers' EV Purchase Intentions

Variable	Author	Year	Effect	Key Findings
Attitude	Liao	2022	Significant positive impact	During the post-pandemic and post-subsidy period in Beijing, Shanghai, and Shenzhen, the study confirmed that attitude had a significant positive influence on purchase intention.
Attitude	He et al.	2023	Significant positive impact	In cities such as Beijing, Shanghai, and Shenzhen, the authors found that attitude significantly predicted Chinese consumers' intentions to purchase electric vehicles.
Attitude	Ji et al.	2024	Most significant positive impact	Based on a survey of 867 Chinese consumers, the study revealed that attitude had the most significant positive impact on purchase intention, surpassing the effects of subjective norms and perceived behavioral control.
Attitude	Wang et al.	2024	Significant positive impact (partial mediation)	Using an extended TPB framework, the research showed that attitude acted as a mediator between policy incentives and adoption intention, and its influence was greater than that of subjective norms and perceived behavioral control.
Attitude	Zheng et al.	2025	Significant positive impact (perceived price as a negative moderator)	A survey of 370 potential consumers across six major cities demonstrated that attitude significantly predicted purchase intention, although perceived price was found to negatively moderate this relationship.
Subjective Norm	Zhang et al.	2022	Significant positive impact	The study validated a pathway in which subjective norms influenced behavioral intention, ultimately affecting consumers' willingness to pay, explaining 49% of the variance in the model.
Subjective Norm	Cong et al.	2023	Significant positive impact	In the Chinese market, the purchase intention of consumers was significantly and positively influenced by subjective norms.
Subjective Norm	Ehsan et al.	2024	Significant impact	Under an extended TPB framework, government encouragement policies were shown to significantly affect consumer decision-making processes.
Subjective Norm	DeJun et al.	2025	Significant positive impact	By integrating TPB with social identity theory, the research indicated that subjective norms primarily influenced purchasing decisions by shaping individuals' perceptions.
Subjective Norm	Liu & Schmidt	2025	Significant positive impact (moderated by face culture)	Applying TPB, consumer behavior theory, and government intervention theory, the study found that China's face culture significantly moderates the relationship between subjective norms and purchase intention.
Perceived Behavioral Control	Wang et al.	2021	Significant positive impact	Face consciousness was found to positively influence Chinese consumers' perceived control over decisions related to adopting electric vehicles.
Perceived Behavioral Control	Zhang et al.	2022	Significant positive impact (relatively weak)	The research showed that perceived behavioral control had a significant positive impact on new energy vehicle purchase intention, although the strength of this effect was relatively weak.
Perceived Behavioral Control	He et al.	2023	No significant impact	Due to insufficient validity, the PBC hypothesis was removed from the model, and mediation analysis confirmed that its impact was not significant.
Perceived Behavioral Control	Xu et al.	2025	Not the most significant factor	By integrating TPB and the TAM model, the study found that perceived behavioral control was not the most significant factor in determining EV purchase intention, although it had a strong effect on perceived value and varied by region.
Perceived Behavioral Control	Hu et al.	2025	Direct and indirect positive impact	In the extended TPB framework, perceived behavioral control was shown to positively influence purchase intention both directly and indirectly through the mediating effect of perceived value.

Table 1 reveals several critical patterns regarding the application of TPB in China's evolving EV market. First, attitude toward EV adoption consistently demonstrates significant positive effects across studies (Liao, 2023; He et al., 2023; Ji et al., 2024; Wang et al., 2024), with Ji et al. (2024) identifying it as the most significant predictor. This consistency suggests that despite market maturation, consumer attitudes remain a fundamental driver, though the magnitude varies by context and measurement approach. Second, subjective norm exhibits uniformly robust effects (Zhang et al., 2022; Cong et al., 2023; Ehsan et al., 2024; DeJun et al., 2025), reflecting China's collectivist culture and the importance of social influence in vehicle purchase decisions. Liu & Schmidt (2024) found that this effect is moderated by risk perception, indicating that social pressures interact with uncertainty concerns in shaping adoption intentions. Third, PBC shows the most notable variation. While Wang et al. (2021) reported a significant positive impact, Zhang et al. (2022) found the effect to be relatively weak, suggesting that PBC's role may depend on infrastructure development stages and regional charging network density. The 2024-2025 PHEV boom has partially circumvented this constraint, as plug-in hybrid vehicles alleviate range and charging anxiety, thereby reshaping the role of PBC.

These patterns indicate that while TPB's core constructs remain relevant in China's post-subsidy EV market, their relative importance and interaction effects require contextualization within the rapidly changing landscape characterized by PHEV proliferation, infrastructure expansion, and policy transitions. Psychological barriers are shifting from "whether to adopt EVs" to "which type of EV to adopt." These contradictions underscore the necessity of the present study. By empirically testing TPB's core constructs, this research explores how China's unique post-subsidy, PHEV-dominated, and hyper-competitive market environment reshapes traditional adoption models. The following hypotheses address these gaps by examining TPB relationships within this transformed context.

7. Conceptual Framework

The proposed conceptual framework exploring the connections between attitude, subjective norm, PBC, and intention to adopt EVs is exhibited in Figure 1.

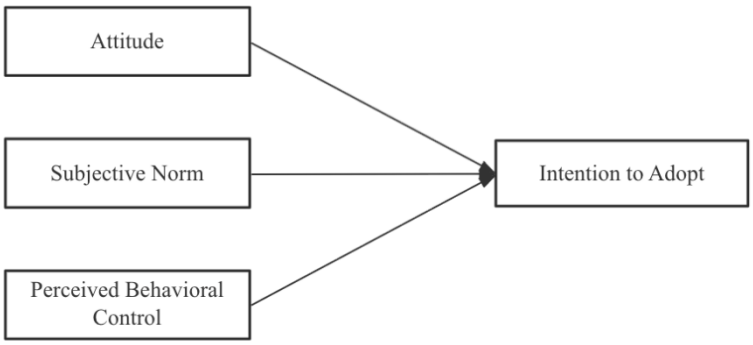

Fig. 1: Conceptual Framework.

It is predicted that attitude, subjective norm, and PBC impact intention to adopt EVs. Chinese consumers' favourable or unfavourable evaluation of EVs, the social pressure they perceive from significant others, and their perception of their ability to perform EV adoption behavior help to explain the changes in intention to adopt EVs. The relationships in the conceptual framework have not been systematically examined in the Chinese EV adoption context. This research proposes the hypothesis articulated below:
H1: Attitude has a significant influence on intention to adopt electric vehicles in China.
H2: Subjective norm has a significant influence on intention to adopt electric vehicles in China.
H3: Perceived behavioral control has a significant influence on intention to adopt electric vehicles in China.

8. Research Methodology

This study selected 11 prefecture-level cities in Shanxi Province, China, as the research scope. As a major coal-producing province in China, Shanxi Province is highly dependent on fossil fuel-based power generation while simultaneously promoting EVs. This structural contradiction makes it a representative case and provides a unique research context for examining how consumers balance environmental goals with energy realities. (Horton et al., 2021). The target population consisted of potential consumers aged 20-40 with electric vehicle adoption intentions, representing approximately 7.64 to 8.73 million people across the province. Following Krejcie & Morgan(1970) Sample size table: the minimum sample size was determined to be 384 at a 95% confidence level. Data were collected through online questionnaires using a snowball sampling method, with measurement instruments employing a 5-point Likert scale. Data analysis was conducted in two stages. The first stage utilized SPSS for descriptive statistics, reliability analysis, and data cleaning. The second stage employed SmartPLS for PLS-SEM analysis, a method suitable for prediction-oriented research with flexible assumptions regarding sample distribution. (Hair et al., 2019).

9. Conclusion

The objective of this research is to unveil the factors explaining the variance in intention to adopt EVs, thereby proposing consumer behaviour prediction strategies and building effective EV promotion approaches in the Chinese market. The continuation of structural incentives, such as NEV purchase tax exemptions and vehicle trade-in subsidies, plays a crucial role in sustaining the adoption of new energy vehicles in China's post-subsidy era. These policies underscore the need to revise traditional adoption models to better align with the evolving market environment and consumer behavior in this transformed context.
Future research may further extend the present conceptual model by incorporating broader finance-related and environmental mechanisms. Variables such as green financing accessibility, ESG-based brand perception, and rebound effects could be examined to capture the structural factors that shape EV adoption beyond psychological determinants. In addition, future studies could introduce additional theoretical perspectives and new variables to develop a more comprehensive understanding of consumer behavior in the rapidly evolving EV market. It may also be valuable to distinguish between BEV and PHEV users, as these groups differ in their risk perceptions and in how they evaluate price, value, and driving needs. Moreover, future research should consider regional heterogeneity, as variations in infrastructure development, policy support, and market maturity across different regions may result in meaningful differences in consumer intentions and adoption behaviors.

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