ASEAN International Sandbox Conference 2025 AISC Proceedings, Volume 6, 2025
http://aseansandbox.org

Factors influencing customers' decision-making to purchase new energy vehicles in China

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Abstract

This study investigates the key factors influencing Chinese consumers' decision-making in purchasing New Energy Vehicles (NEVs), with particular focus on the role of intelligent connected technology. Employing quantitative research methods, data was collected through questionnaires and analyzed using statistical tools. The research scope covers potential NEV buyers in major Chinese cities, examining multidimensional variables including technological features, family factors, and social influences on purchasing decisions.

The findings reveal that intelligent connected technology significantly enhances consumers' purchase intention, with autonomous driving capabilities and smart interactive systems being the most attractive features. Additionally, family usage needs, environmental awareness, and social recognition demonstrate substantial influence. Based on the results, recommendations include manufacturers strengthening R&D in smart technologies, policymakers improving supporting infrastructure, and implementing targeted marketing to enhance consumer awareness. This study provides both theoretical support and practical guidance for promoting the development of the NEV market.

Keywords: *New Energy Vehicles (NEVs), Decision-making, Purchase Intention, Intelligent Internet Technology, Globalization, Market Expansion, Technological Innovation*

1. Introduction

1.1 Background of Study

The rapid development of artificial intelligence, 5G communication, big data, and cloud computing has deeply transformed traditional industries, including the automotive sector. Intelligent Internet technology, particularly in the context of the Internet of Vehicles (IoV), not only redefines driving experiences but also enables continuous interaction between vehicles, users, and infrastructure. In China, NEVs serve as a strategic emerging industry, with intelligent features becoming a key factor in differentiating brands and influencing purchase decisions. Smart dashboards, adaptive cruise control, voice interaction, remote diagnostics, and route optimization are no longer luxuries but expected standards among tech-savvy consumers.

These advancements do not only fulfill functional expectations but also meet emotional and social needs such as safety assurance, family connectivity, environmental responsibility, and social identity. As Chinese consumers become increasingly digitalized, their preferences for NEVs are also shaped by their familiarity with intelligent ecosystems provided by domestic tech giants such as Huawei, Baidu, and Xiaomi, which are now actively involved in the NEV sector.

Moreover, with the growing emphasis on green development and digital transformation, the integration of intelligent Internet technology with Chinese new energy vehicles (NEVs) has become a critical area of interest. However, this study is grounded in the understanding that apart from intelligent technologies what are the other factors that also influence customers decision-making to buy NEVs.

1.2 Problem Statement

While Chinese's new energy vehicle (NEV) industry has achieved significant technological progress, the actual purchase decisions made by consumers are shaped by more than just product specifications or innovation. Despite growing adoption rates, a critical challenge remains: identifying which specific factors most influence the willingness of Chinese consumers to buy NEVs. There is still a lack of some factors that impact consumers decision making to buy NEVs.

Research questions:

1) Apart from intelligent technology, what are the other factors influencing consumers' decision-making to buy NEVs?
2) What are the factors that impact most consumer decision-making to buy it?

1.3 Significance of the Study

The study contributes to both academic literature and business practice. Academically, it extends knowledge for research growth in the context of intelligent NEV adoption. Practically, it provides empirical data and insights to NEV companies on how valuable factors influence consumers' decision-making to buy NEVs.

2. Objectives

This study aims to identify and analyze the core factors that influence Chinese consumers' decision-making when purchasing new energy vehicles (NEVs). The research focuses on environmental concern, price sensitivity, perceived performance, economic benefits of usage, and policy, exploring their individual and combined effects on purchase intention.

1) To study various factors influencing customer decision-making to buy NEVs.
2) To explore the factors that affect most consumers' decision-making to buy NEVs.
3) To provide recommendations for NEV manufacturers and marketers to tailor their products and campaigns based on these insights.

3. Materials and Methods

3.1 Research Design

This section provides an overview of the key elements of the research design, including the research concept, research methods, data collection methods, and data analysis techniques. This study adopts a quantitative approach, using a structured questionnaire to measure the relationship between intelligent Internet features and other factors affecting consumers' purchase intentions. The research employs the positivist paradigm and deductive reasoning to guide the methodology.

3.1.1 Research Philosophy

The research philosophy adopted in this study is positivism, which emphasizes the objectivity and empiricism of scientific inquiry. Positivism posits that the primary objective of research is to establish causal relationships and general laws through systematic observation and experimentation. In this study, we will use quantitative research methods to test hypotheses and gain a general understanding of how intelligent Internet technologies and other factors affect consumers' purchase intentions.

3.1.2 Research Approach

This study will adopt a deductive research method. This method starts with existing theories and frameworks, which will be used to establish hypotheses about the relationship between intelligent Internet technologies and other factors affecting consumers' purchase intentions. Then, empirical data collected through various methods will be used to test these hypotheses. The deductive method ensures that the research is based on established theories and allows for the development of a clear and focused research question.

3.1.3 Data Collection Methods

To ensure the validity and reliability of the research results, a quantitative research method will be adopted to collect data through surveys. A structured questionnaire will be developed to collect data from new energy vehicle companies and consumers. The survey will cover various aspects of consumers' personal factors, family factors, social factors, and environmental factors. The awareness of consumers' purchases of new energy vehicles will be collected by distributing questionnaires.

3.1.4 Data Analysis Techniques

This This study uses statistical software to conduct both descriptive and inferential data analyses.

Descriptive statistics are used to summarize the demographic characteristics of respondents and analyze the central tendencies (means, standard deviations) of each construct measured in the questionnaire. This helps provide a general overview of the sample and the distribution of responses.

Confirmatory Factor Analysis (CFA) is conducted to evaluate the validity and reliability of the measurement model. CFA assesses how well the observed variables represent the latent constructs. Indicators such as Composite Reliability (CR) and Average Variance Extracted (AVE) are examined to ensure internal consistency and convergent validity.

Pearson correlation analysis is then used to explore the strength and direction of linear relationships among the independent variables (e.g., personal, emotional, family, and environmental factors) and the dependent variable (purchase intention).

Multiple regression analysis is applied to test the research hypotheses. This method evaluates the relative influence of each independent factor on purchase intention, while controlling for other variables, to determine which factors have a statistically significant impact on consumers' decisions to purchase new energy vehicles.

In summary, this study employs a multi-step analytical strategy to ensure a rigorous and comprehensive evaluation of the proposed research model and hypotheses.

3.2 Population and Samples

3.2.1 Sampling Framework

The target population of this study includes key stakeholders in the new energy vehicle (NEV) industry, including NEV manufacturers and consumers in China. This diverse demographic allows us to gain a comprehensive understanding of consumer perceptions towards the purchase of new energy vehicles and how to promote the development of the NEV sector.

3.2.2 Sampling Method

This study collected 520 the responses from users and potential buyers of new energy vehicles (NEVs) in urban areas. A stratified convenience sampling method was employed to cover various demographic characteristics.

In summary, the research design of this study is comprehensive and multifaceted, conducting a rigorous examination of the global development strategy of the new energy vehicle industry through quantitative analysis. The population and sampling framework were carefully designed to ensure the representativeness and diversity of the sample, thereby allowing for a thorough understanding of the industry. The sample size was determined through power analysis to ensure that the study has sufficient statistical power to detect meaningful differences and relationships in the data.

3.2.3 Sample Size

The sample size for this study will be determined based on the power analysis of the statistical tests to be used in the quantitative analysis. The power analysis will consider factors such as the expected effect size, the desired level of statistical significance, and the variability within the population. By conducting a power analysis, the study aims to ensure that the sample size is sufficient to detect meaningful differences and relationships within the data, while also balancing the practical constraints of time and resources.

It is anticipated that the sample size will be calculated by using the Yamane model as follow in the range of 400 participants, comprising a mix of NEV manufacturers, and consumers. This sample size is expected to provide a robust dataset for the quantitative analysis.

In summary, the research design for this study is comprehensive and multi-faceted, by using quantitative analysis to provide a rigorous examination of the global development strategy of the NEV industry. The population and sampling framework are carefully designed to ensure the representativeness and diversity of the sample, allowing for a holistic view of the industry. The sample size is determined through a power analysis to ensure that the study has sufficient statistical power to detect meaningful differences and relationships within the data.

3.3 Research Instruments

Based on the validated constructs, a 5-point Likert scale questionnaire was developed to measure five dimensions: personal factors, social factors, emotional factors, family factors, and environmental factors. The scale was reviewed by experts to ensure content validity, and Cronbach's alpha coefficient was used to measure reliability.

4. Results and Discussion

4.1 Results

Table 1 shows the mean value of family factors is the highest (3.3780), significantly higher than other factors. This indicates that the sample evaluates the importance of "family factors" most highly, possibly reflecting that families play a core role in decision-making, behavior, or attitudes. The mean value of willingness is 3.2010, ranking second. The self-reported "willingness" is at a moderately high level, suggesting a positive subjective tendency. The mean value of personal factors is 3.1913, close to the score of "willingness". Internal personal factors (such as values and abilities) have a significant impact on the sample, jointly forming the main driving force with family factors. The mean value of environmental factors is 3.1864, slightly higher than those of "Social factors (3.1832)" and "Emotional factors (3.1243)".

In terms of influencing factors, the average value of family factors was the highest (M=3.3780, SD=1.0327), indicating that family support had the most significant impact on the willingness to take the postgraduate entrance examination, followed by personal factors (M=3.1913, SD=0.9834) and social factors (M=3.1832, SD=1.0762).

Table 1 Mean and Variance of Influencing Factors

Factor	M (mean)	Environmental factors (standard deviation)
Willingness	3.20100	1.04990
Personal factors	3.19130	0.98335
Social factors	3.18320	1.07616
Emotional factors	3.12430	1.05760
Family factors	3.37800	1.03273
Environmental factors	3.18640	1.06541

Employed confirmatory factor analysis (CFA) to verify the convergent validity of the questionnaire. Most dimensions demonstrate good internal consistency, with composite reliability (CR) values exceeding 0.7. Specifically, personal factors (CR = 0.8007), emotional factors (CR = 0.7757), and individual purchase intention (CR = 0.7442) show high reliability. Although social factors (CR = 0.6741) and family factors (CR = 0.6666) fall slightly below the 0.7 threshold, they remain within an acceptable range. The CR value for environmental factors is the lowest (0.4434), indicating weaker reliability for this dimension.

In terms of average variance extracted (AVE), all dimensions exceed the minimum threshold of 0.4, suggesting good convergent validity. Notably, emotional factors (AVE = 0.4648) and family factors (AVE = 0.5007) demonstrate relatively strong explanatory power.

Table 2 Confirmatory Factor Analysis

Variable	Dimension	Number of items	CR	AVE
Independent variable	Personal factors	6	0.8007	0.4022
	Social factors	3	0.6741	0.4108
	Emotional factors	4	0.7757	0.4648
	Family factors	3	0.6666	0.5007
	Environmental factor	3	0.4434	0.4434
Dependent variable	Individual purchase intention	4	0.7442	0.4219

Correlation analysis reveals significant relationships between various factors influencing the purchase intention of NEVs, including personal, social, emotional, family, and environmental factors.

Table 3 Correlation Analysis

	Wish	Personal factors	Social factors	Emotional factors	Family factors	Environmental factor
Wish	1					
Personal Factors	.518**	1				
Social factors	.538**	.572**	1			
Emotional Factors	.514**	.542**	.511**	1		
Family factors	.534**	.539**	.538**	.559**	1	
Environmental factor	.505**	.535**	.448**	.527**	.494**	1

** At 0.01 level (two tailed), the correlation was significant.

Table 3 shows all factors are significantly positively correlated with "willingness" at an extremely significant level, with correlation coefficients ranging from 0.505 to 0.538, indicating that each factor can significantly predict willingness. Among them, social factors have the strongest association with willingness.

4.2 Discussion

This study conducted an in-depth analysis of the globalization model of new energy vehicles in China and investigated the willingness to purchase new energy vehicles. The research results showed that:

China's new energy vehicles have made significant progress in battery technology, intelligent driving and other fields, with high cost-effectiveness and advanced technology, becoming an important competitive advantage in the global market. Chinese new energy vehicle companies are accelerating their internationalization layout, with a focus on expanding into regional markets such as Latin America, ASEAN, and the Middle East. At the same time, the influence of Chinese brands in overseas markets is gradually increasing, and some high-end new energy vehicle brands have attracted the attention of international consumers.

In the survey of consumer willingness, the research results indicate that consumers' purchase intention is gradually increasing. In 2023, Chinese consumers' willingness to purchase new energy vehicles has increased for six consecutive years, reaching 33%, an increase of 6 percentage points from the previous year's 27%. Among them, the intention to purchase rate of new energy SUVs has increased significantly, jumping from 11% in the previous year to 16%. The most concerned factors among consumers' purchase reasons are environmental protection and energy conservation (13.6%), reasonable price (13.0%), and performance advantage (12.0%). In addition, consumers still have significant room for improvement in the range and safety performance of new energy vehicles. This further indicates a significant trend of consumer upgrading, with an increasing demand for mid to high end new energy vehicles. At the same time, the influence of domestic and new force brands continues to increase, with consumers' intention to purchase domestic brands exceeding 50% for two consecutive years, and the purchase intention of new force brands also continues to increase.

5. Conclusion

The study highlights the significant progress of Chinese NEVs in battery technology and intelligent driving, as well as the increasing consumer willingness to purchase NEVs. The findings underscore the importance of technological innovation, market expansion, and international cooperation in enhancing the global competitiveness of Chinese NEVs.

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