

SEM-based Analysis of Factors Influencing the Purchase Intention of Electric Vehicle Consumers

Yu Yang, Jianyi Lan

School of Business Administration, Henan Polytechnic University, Jiaozuo 454000, Henan, China

Abstract: Consumers' purchase intention plays an important role in the development of the electric vehicle industry. Based on the SOR model, this paper investigates the factors influencing the purchase intention of electric vehicle consumers in four dimensions: product attributes, environmental perceptions, charging policies, and subjective norms. The results show that: product attributes and environmental perceptions may influence consumers' perceived risk, and improving product performance and reducing environmental pollution in the production process will increase consumers' willingness to purchase; charging policy and subjective regulation have significant effects on consumers' willingness to purchase through consumers' perceived value and perceived risk, and improving charging policy will help improve consumers' willingness to purchase. Improving the charging policy helps to enhance consumers' purchase intention; consumers pay more attention to the perceived value of electric vehicles than to the perceived risk. Accordingly, this paper proposes that car companies should focus on the performance of electric vehicles, strictly control the production process, develop marketing strategies, and improve the charging policy jointly with relevant departments to enhance consumers' purchase intention.

Keywords: ELEctric vehicles, SOR model, Structural equation model, Purchase intention.

1. Introduction

In recent years, China's new energy vehicle industry has been developing rapidly, with a significant increase in core technology, improved charging technology and continuous innovation in the after-sales service system. It can be said that China's new energy vehicle industry has formed a good foundation, and the development of new energy vehicles has entered a comprehensive market expansion period[1]. At the same time, the Central Development and Reform Commission stressed that the development of new energy vehicles is the top priority to achieve the goal of "double carbon"[2]. Zhang Liang[3] said that new energy vehicles will definitely usher in the development opportunities of explosive growth, but at the same time there are many urgent problems to be solved.

Zhang Fan et al.[4] studied the factors influencing the satisfaction of new energy vehicles and found that not only the performance of the product itself has a strong influence on product satisfaction, but also the characteristics of consumers' own attributes are important factors influencing product satisfaction. EGBUE O[5] concluded that user satisfaction of new energy vehicles is related to gender, age and education level. Zhao Fuquan et al.[6] showed that people have some concerns about range, charging time and product quality. Zhang Yating et al.[7] found through the study that: the number of charging piles is the most important factor affecting the satisfaction of vehicle owners, followed by the location of charging piles. Wang Xuedong et al.[8] studied the continuous use intention of new energy vehicle users by constructing a structural equation model, and the results showed that user satisfaction is the key factor affecting the continuous use intention of users, and trust is the most important factor to improve user satisfaction.

Through the current situation of domestic and international research, most scholars have studied consumers' willingness to purchase or behavior of electric vehicles in terms of consumers' demographic characteristics, charging range, and

vehicle quality, while less research has been conducted on the influence of subjective norms and environmental perceptions on consumers. Most scholars use TPB theory and other methods to conduct research, but few scholars use the SOR model to conduct in-depth research on consumers' willingness to purchase electric vehicles. In this paper, by establishing the SOR model, designing a survey questionnaire and using valid data combined with structural equation modeling, we analyze the influence of each factor on consumer willingness to purchase through consumers' perceived value and perceived risk and the degree of their influence. This study gives suggestions to the various aspects of electric vehicle enterprises such as production and sales, and also provides references to the relevant government departments on the policies related to new energy vehicles.

2. Research Model and Research Hypothesis

2.1. SOR model

The SOR model, the Stimulus-Organism-Response (external stimulus-perception-response) model. The model was first proposed by MEHRABIAN et al.[9], and really got its first practical application when Belk[10] used the model to study the influence of environmental variables on consumer decisions. Li Xin et al.[11] used the SOR model to study consumer behavior and the results showed that trust, satisfaction and relationship commitment play an extremely important role in community group purchasing. Li-Ru Li et al.[12] A study of consumer purchase behavior based on the SOR model found that green ad acceptance has a positive effect on perceived value, positive emotion, and purchase intention.

In this paper, we will investigate four external stimulus dimensions: product attributes, environmental perceptions, charging policies, and subjective norms. Perceived value is defined as the psychological, economic, and social value perceived by EV consumers in the four external stimulus

dimensions. Perceived risk is the financial, environmental, and safety risks perceived by consumers in the four external stimulus dimensions.

2.2. Model Assumptions

(1) Impact of product attributes on consumer perception

In this paper, the product attributes mainly include the price, quality, safety and other performance of electric vehicles. Brian et al.[13] found that fuel cost and product price have the most influence on consumers in Ireland by studying the factors that influence consumers' purchase of new energy vehicles in the region. Egbue et al.[14] concluded that the defects of some inherent attributes of new energy vehicles not only The study found that the cost of fuel and the price of the product had the greatest impact on consumers.

Shi Hongbo et al.[15] pointed out that price, supporting facilities, and range are important factors that limit consumers' purchase of new energy vehicles. The results of the study by Xiangdong Zhang[16] show that the degree of price change and the level of price interval significantly affect consumers' purchase intention. Li et al.[17] showed that most consumers are more interested in the quality and performance of new energy vehicle products. Chaoqi Zhu et al.[18] found that many consumers are concerned about the quality and safety of new energy vehicles.

From the current research on the influence of product attributes on consumer perception at home and abroad, it is easy to find that consumers are more concerned about the product attributes of electric vehicles because the quality of the product directly affects the use of consumers; the price of the product determines the consumer group and the variety of consumer choices; and the safety performance of electric vehicles is the most important. The excellent attributes of the product will enhance the perceived value of consumers, and the same, the good price and performance of electric vehicles in all aspects can largely reduce the concerns of consumers.

Based on the above analysis, the following hypotheses are formulated:

H1a: Product attributes have a positive effect on perceived value.

H1b: Product attributes have a negative effect on perceived risk.

(2) The influence of environmental cognition on consumer perception

Consumers' environmental cognitions is consumers' perceptions of green concepts. Electric vehicles not only save energy because they use green energy as power, but also reduce air pollution and make a great contribution to global environmental cognition. Lin et al.[19] showed that the main reason for consumers to buy and use new energy vehicles is that consumers feel that this behavior helps to reduce air pollution and protect the environment. Liu, Yingqi et al.[20] showed that increased public awareness of low carbon could help accelerate the development of new energy vehicles. Chao Wang et al.[21] point out that consumers' environmental awareness has an impact on consumers' intention to purchase new energy vehicles.

Consumers' environmental cognition will positively influence consumers' green consumption behaviors, thus strengthening their perceptions of the value of electric vehicle products and enhancing their purchase intentions. As consumers' green consumption psychology is satisfied, their concerns about new energy vehicles will be reduced.

Based on the above analysis, the following hypotheses are

formulated:

H2a: Environmental Cognition have a positive effect on perceived value.

H2b: Environmental Cognition have a negative effect on perceived risk.

(3) Impact of charging policies on consumer perceptions

As the core power unit of electric vehicles, the battery directly affects the use of the car, so it is also the focus of consumers' concern. Charging policy is the construction of basic charging facilities including charging piles and charging base stations, as well as tariffs and other related policies introduced by electric vehicle companies. Yin Zhengyuan[22] obtained through research and analysis that consumers have concerns about the battery life of new energy vehicles, the location of charging stations, and the range. Li Zhen et al.[23] showed that the government should vigorously strengthen incentive policies such as charging piles and other facilities. Li Chuang et al.[24] pointed out that charging facilities and charging policies are the prominent factors affecting the purchase intention of new energy vehicles.

Since the introduction of electric vehicles, the problems of battery life, replacement, recycling and charging have been troubling consumers. If the government introduces a corresponding charging policy to enhance the use of new energy vehicles, it will greatly enhance the perceived value of consumers, and at the same time, the anxiety of consumers due to the range and charging of electric vehicles will be greatly relieved.

Based on the above analysis, the following hypotheses are formulated:

H3a: Charging policy has a positive effect on perceived value.

H3b: Charging policy has a negative effect on perceived risk.

(4) Impact of subjective norms on consumer perception

Subjective norms refer to the fact that because individuals have limited access to information, they are influenced by surrounding factors that create pressure, when individual behavior is influenced by the opinions or suggestions of groups in their surroundings. In this study, the subjective norms are mainly the advice of consumers from their relatives, friends and other groups when purchasing new energy vehicles, as well as the advertising and marketing strategies and tactics of new energy vehicle companies. TERRY et al.[25] found that Chinese consumers are more eager to receive recognition from people around them and society. Xu Guohu et al.[26] showed that consumers are influenced by the words and suggestions of their friends and relatives when purchasing new energy vehicles. She Jinfeng et al.[27] suggested that promotional activities and advertising by car companies have an impact on consumers' purchase intentions.

The subjective norms caused by the surrounding trusted group will make consumers more realistic about the advantages and defects of electric vehicles, and the advertising and promotion as well as marketing methods of the business will attract consumers to buy electric vehicles. Due to the recommendation of trusted people, consumers will think that the product is recognized by the surrounding group, and they will get more satisfaction psychologically, and will reduce their worries about electric vehicles to a greater extent.

Based on the above analysis, the following hypotheses are formulated:

H4a: Subjective norms have a positive effect on perceived value.

H4b: Subjective norms have a negative effect on perceived risk.

(5) The influence of consumer perception on consumption intention

The results of a study by Hanxin Xue[28] showed that consumers' perceived value is the primary factor influencing consumers' willingness to consume. Wang et al.[29] showed that perceived value plays a mediating role in the relationship between unfamiliar word-of-mouth influencing purchase intention. Nupur et al.[30] showed that there is a significant relationship between consumers' green perceived value on awareness and positive attitudes towards sustainable purchasing. There is an influential relationship between consumers' perceived value and willingness to consume, and consumers' perceived value up to a certain dimension will enhance willingness to consume to a certain extent.

Based on the above analysis, the following hypotheses are formulated:

H5a: Perceived value has a positive effect on consumption intention.

Bauer[31] defines perceived risk as uncertainty about the outcome of a decision or purchase and the expectation of the severity of the consequences of a wrong decision. Nena Lim et al.[32] show that customers' perception of risk has an impact on their willingness to buy. Kai Chen et al.[33] found that perceived risk has a significant negative effect on purchase intention. Jie-Lin Yin et al.[34] found that consumers' perceived risk of new energy vehicles has a significant negative effect on purchase intention. A series of factors that may cause safety problems, such as various quality, charging, materials, and braking systems of electric vehicles, all cause consumers' awareness of risk and constitute consumers' perceived risk. When consumers' perceived risk is greater, the likelihood of their willingness to consume is smaller.

Based on the above analysis, the following hypotheses are formulated:

H5b: Perceived risk has a negative effect on consumption intention.

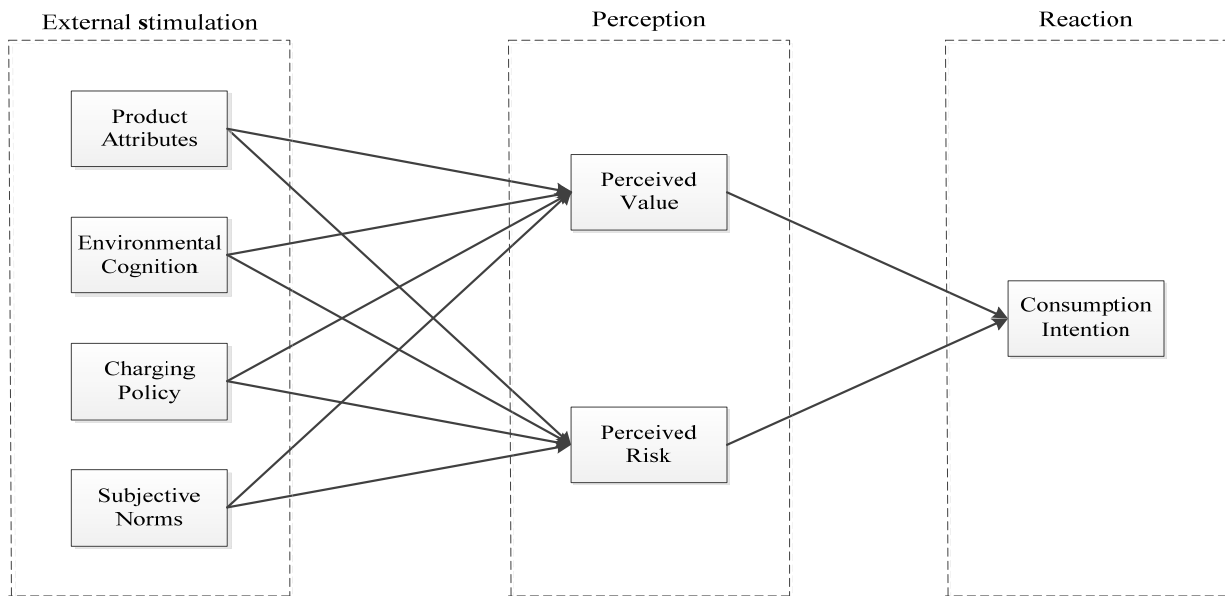


Figure 1. SOR research model

3. Scale Design and Analysis of Results

3.1. Scale design

Before formally distributing the questionnaire, a small-scale pre-study as well as interviews were conducted, after which the scale was modified to form the final official scale. The latent variables in this paper (product attributes, environmental perceptions, charging policy, subjective norms, perceived value, perceived risk, and consumption intentions) were studied using a five-point Likert scale. The final scale is shown in Table 1.

The questionnaires were all distributed using the "Questionnaire Star" platform for the production and distribution of electronic questionnaires. A total of 457 questionnaires were collected, and after removing 20 invalid questionnaires, 437 valid questionnaires remained, with an effective rate of 95.62%.

3.2. Basic information of survey respondents

Among the respondents, 50.34% were male and 49.66% were female, with no big gap between male and female ratio. 52.17% were under 30 years old and 47.83% were over 30 years old, and the age ratio was in line with the distribution of different audience age groups of electric vehicles. The percentage of highly educated people with bachelor's degree or above is 48.52%, which further verifies the reliability of the questionnaire. The group with monthly income below 5,000 yuan accounted for 65.44%, and the group with monthly income above 5,000 yuan accounted for 34.56%. The married group accounted for a higher percentage of 79.41% and the unmarried group accounted for 20.59%, indicating that the married group has a greater demand for electric vehicles than the unmarried group. The demographic characteristics of the sample are shown in Table 2.

Table 1. Variable table

Variables	Number	Title item	Title Source
Product Attributes (Product Attributes)	PA1	The market price of electric vehicles is one of my main considerations	Brian and others[13] , Egbue et al.[14] , Fan Huangjian et al.[35]
	PA2	I am more concerned about the interior workmanship of electric cars	
	PA3	I will consider the safety performance of electric vehicles	
	PA4	I focus on the overall quality of electric vehicles	
Environmental Cognition (Environmental Cognition)	EC1	Damage to the environment can have serious consequences for the planet and people	Yang Xiaoyan et al.[36] , Yang Wu[37] , Stern et al.[38]
	EC2	I am always concerned about environmental issues	
	EC3	Electric vehicles help reduce air pollution and protect the environment	
	EC4	Purchase of electric vehicles contributes to sustainable social development	
	EC5	Buying an electric car helps to raise your environmental awareness and perception	
Charging Policy (Charging Policy)	CP1	I am more focused on the charging policy of electric vehicles	Li Chuang et al.[24] , Ge Jianping et al.[39]
	CP2	Convenient charging policy will increase my willingness to buy electric cars	
	CP3	I often pay attention to the policy of supplying basic charging facilities such as charging piles	
	CP4	The construction of infrastructure such as charging piles for electric vehicles is more reasonable	
	CP5	Charging policy for electric vehicles is more reasonable	
Subjective Norms (Subjective Norms)	SN1	I often pay attention to the electric car ads	Brian and others[13] , TERRY et al.[25]
	SN2	I am more concerned about the promotions offered by EV sellers	
	SN3	I will listen to the opinions and suggestions of people around me when I spend money	
	SN4	I will take advice from people around me when buying an electric car	
Perceived Value (Perceived Value)	PV1	The cost of electricity is lower than the price of oil, so it is less expensive to use	Kai Chen et al.[33] , Sweeney et al.[40]
	PV2	Electric cars are better value for money	
	PV3	I think the electric car powertrain is satisfying	
	PV4	More stable operating performance of electric vehicles	
	PV5	Using electric cars can give a sense of pleasure	
Perceived Risk (Perceived Risk)	PR1	I am concerned about the flawed performance of electric vehicles	Wang Ying et al.[41]
	PR2	I am concerned that electric cars will not perform as expected	
	PR3	I am concerned that the car's battery may have safety-threatening issues	
	PR4	I am worried that because the design is not perfect will cause harm to the human body	
	PR5	I am concerned about property damage due to inadequate related infrastructure	
Willingness to consume (Consumption Intention)	CI1	I would consider buying an electric car	Bagozzi[42] et al. Yang Wu[37]
	CI2	I look forward to launching more electric cars	
	CI3	I would recommend electric cars to my family and friends	

Table 2. Demographic characteristics of the sample

Features	Options	Sample size	Frequency
Gender	Male	220	50.34%
	Female	217	49.66%
Age	18-25 years old	110	25.17%
	26-30 years old	118	27.00%
	31-40 years old	96	21.97%
	41-50 years old	84	19.22%
	Over 50 years old	29	6.64%
	Junior high school and below	46	10.53%
Education level	High School	67	15.33%
	Specialty	112	25.63%
	Undergraduate	149	34.10%
	Master's degree and above	63	14.42%
Monthly income	Under 3000 RMB	134	30.66%
	3000-5000RMB	152	34.78%
	5000-7000RMB	62	14.19%
	7000-10000RMB	59	13.50%
	10000RMB or more	30	6.86%
Marital Status	Unmarried	90	20.59%
	Married	347	79.41%

3.3. Scale reliability test

In this study, SPSS 26.0 was used to test the reliability of the scales as well as exploratory factor analysis (EFA).

The reliability of the scale was expressed by the Cronbach's alpha coefficient. The overall Cronbach's α coefficient for the scale in this study was 0.935, which is greater than the

coefficient requirement of 0.7, indicating that the scale has good internal consistency. The Cronbach's α coefficients for each dimension of the scale are shown in Table 3. The Cronbach's α coefficients of all dimensions of the scale were greater than 0.8, indicating that the internal consistency of the scale was good and the reliability was high.

For the validity test of the scale, the KMO value of the

overall scale was 0.962, which was greater than the standard requirement of 0.7. The Bartlett's spherical test approximate chi-square value was 9684.061, which was significant at 0 ($p < 0.01$) and passed the significance test at the 1% level of

significance. Except for the KMO value of 0.721 for the consumer intention dimension, the KMO values of all other dimensions were greater than 0.8, indicating that the overall scale reliability was good.

Table 3. Reliability and validity test of the scale

latent variable	Title item	Cronbach's alpha coefficient	KMO
Product Properties	PA1, PA2, PA3, PA4	0.896	0.840
Environmental Awareness	EC1, EC2, EC3, EC4, EC5	0.915	0.898
Charging Policy	CP1, CP2, CP3, CP4, CP5	0.914	0.893
Subjective norms	SN1, SN2, SN3, SN4	0.865	0.828
Perceived Value	PV1, PV2, PV3, PV4, PV5	0.856	0.865
Perceived Risk	PR1, PR2, PR3, PR4, PR5	0.899	0.883
Willingness to consume	CI1, CI2, CI3	0.830	0.721

Validated factor analysis (CFA) was performed on the scale using Amos 24.0. The convergent validity of the test scale was to be determined based on the values of the standardized factor loading coefficients, the combined reliability (CR), and the average variance variance extracted (AVE). As can be seen from Table 4, the standardized factor loadings of the question items corresponding to all latent variables are greater than 0.7, which meets the criteria for variable setting,

indicating that the question items are a better match for the latent variables. The average variance extracted (AVE) of each variable in the scale is greater than 0.5, and the combined reliability (CR) is greater than 0.8. $AVE > 0.5$ indicates good aggregation[43], and $CR > 0.7$ indicates good combined reliability[44]. In summary, the consistency and convergence of the scales are good and suitable for structural equation modeling.

Table 4. Convergence validity of the scale

latent variable	Measurement question items	Standardized Factor Loads	AVE	CR
Product Properties	PA1: The market price of electric vehicles is one of my main considerations	0.849	0.684	0.896
	PA2: I care more about the interior workmanship of electric cars	0.793		
	PA3: I will consider the safety performance of electric vehicles	0.818		
	PA4: I focus on the overall quality of electric vehicles	0.846		
Environmental Awareness	EC1: Damage to the environment can have serious consequences for the planet and for people	0.801	0.684	0.915
	EC2: I am always concerned about environmental issues	0.813		
	EC3: Electric vehicles help reduce air pollution and protect the environment	0.823		
	EC4: Purchasing electric cars contributes to sustainable social development	0.861		
	EC5: Buying electric cars helps to improve your environmental awareness and concept	0.836		
Charging Policy	CP1: I pay more attention to the charging policy of electric vehicles	0.800	0.682	0.915
	CP2: Convenient charging policy will increase my willingness to buy electric cars	0.841		
	CP3: I often pay attention to the supply policy of basic charging facilities such as charging piles	0.852		
	CP4: The construction of infrastructure such as charging piles for electric vehicles is more reasonable	0.810		
	CP5: Charging policy of electric vehicles is more reasonable	0.824		
Subjective norms	SN1: I often pay attention to the ads of electric cars	0.792	0.612	0.865
	SN2: I am more concerned about the promotions launched by electric car sellers	0.814		
	SN3: I listen to the opinions and suggestions of people around me when I spend money	0.759		
	SN4: I will listen to the advice of people around me when I buy an electric car	0.772		
Perceived Value	PV1: The cost of electricity is lower than the price of oil, so it is less expensive to use	0.788	0.560	0.864
	PV2: The price of electric cars is more cost-effective	0.770		
	PV3: I think the power system of the electric car makes people satisfied	0.722		
	PV4: More stable operating performance of electric vehicles	0.759		
	PV5: Use of electric cars can give a sense of pleasure	0.700		
Perceived Risk	PR1: I am concerned about the defective performance of electric vehicles	0.772	0.642	0.900
	PR2: I am worried that the performance of electric cars will not meet expectations	0.818		
	PR3: I am concerned that the car's battery may have safety-threatening problems	0.775		
	PR4: I am worried that because the design is not perfect will cause harm to the human body	0.815		
	PR5: I am concerned about property damage due to inadequate related infrastructure	0.824		
Willingness to consume	CI1: I would consider buying an electric car	0.825	0.621	0.834
	CI2: I look forward to launching more electric cars	0.739		
	CI3: I would recommend new energy electric vehicles to my family and friends	0.797		

3.4. Model fitness test

In order to further test the reasonableness of the structural equation model, the model needs to be tested for fitness. As

shown in Table 5 the cardinality to degrees of freedom ratio of the model is 1.217, which is in line with the standard value range of 1-3; GFI, NFI and other indicators are in line with the ideal good standard value[45].

Table 5. Fitness test

Suitability test index	Models	Standard value
CMIN/DF	1.217	(1., 3)
GFI	0.933	>0.9
AGFI	0.920	>0.9
NFI	0.949	>0.9
CFI	0.990	>0.9
IFI	0.990	>0.9
RMR	0.036	<0.05
RMSEA	0.022	<0.05

4. Path Analysis and Parameter Estimation

4.1. Structural equation model and its path analysis

In this paper, the structural equation model is constructed and analyzed using SPSS 26.0 software. The structural

equation model is shown in Figure 2, which contains the coefficients of each path as well as the structural and measurement models. Table 6 shows the results of the path analysis, which includes the standardized path coefficients of the hypothetical paths, the critical ratio C.R., and the p-value. The path can be considered significant at a significance level of 0.05 if the absolute value of C.R. is greater than 1.96.

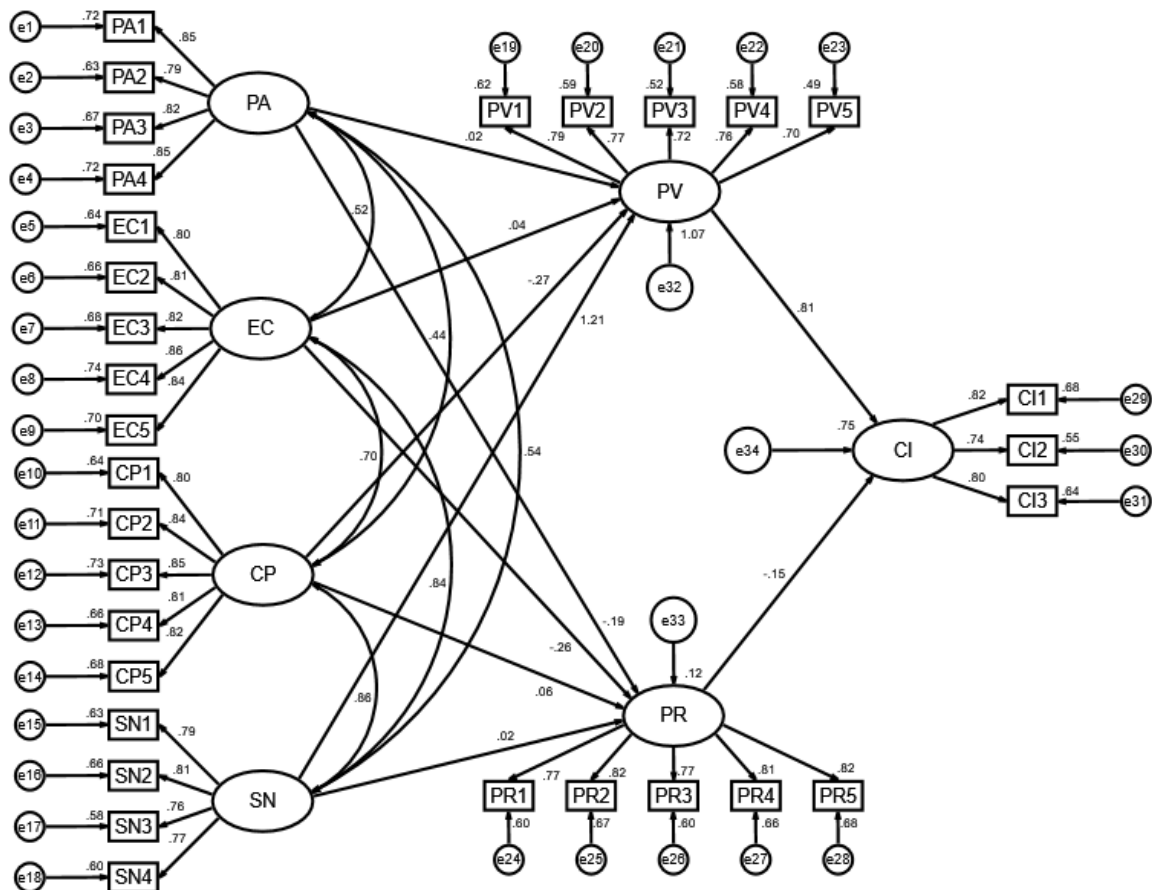


Figure 2. Structural equation model path analysis

Table 6. Path analysis results of structural equation model

Assumptions	Standardized path coefficient	C.R.	P	Conclusion
H1a: Product attributes → perceived value	0.016	0.441	0.659	Not supported
H1b: Product attributes → perceived risk	-0.191	-3.020	0.003	Support
H2a: Environmental perception → perceived value.	0.04	0.559	0.576	Not supported
H2b: Environmental Perception → Perceived Risk	-0.264	-2.458	0.014	Support
H3a: Charging policy → perceived value	-0.270	-3.192	0.001	Support
H3b: Charging Policy → Perceived Risk	0.058	0.519	0.604	Not supported
H4a: Subjective norms → perceived value	1.212	8.253	***	Support
H4b: Subjective norms → perceived risk	0.02	0.13	0.896	Not supported
H5a: Perceived value → Willingness to consume	0.813	15.703	***	Support
H5b: Perceived risk → willingness to consume	-0.147	-3.865	***	Support

Based on the above structural equation model paths and the results of their analysis, the following conclusions can be drawn:

(1) Product attributes failed to pass the significance test on perceived value, indicating that product attributes have a small effect on consumers' perceived value in this study. Since product attributes were mainly studied in this study with price, quality, and safety as the main features, it may also be due to the fact that the design of this variable failed to pinpoint the dimensions. The more significant impact of product attributes on perceived risk indicates that the quality of the electric vehicle itself as well as the workmanship and other aspects can affect consumers' judgment when purchasing an electric vehicle.

(2) Consumers' environmental perceptions do not influence consumers' perceived value, but rather have a significant impact on perceived risk. Most consumers believe that purchasing an electric vehicle does not contribute to environmental protection, including the fact that the power battery and other components of the vehicle may cause environmental pollution when they are manufactured and used, and that the recycling of the power battery of electric vehicles is a problem that many companies are thinking about.

(3) Charging policy is a dimension that EV consumers are extremely concerned about, so charging policy significantly affects consumers' perceived value, but it has little effect on perceived risk. After the research, we found that one of the reasons why consumers are very concerned about the charging policy of EVs is that they are less satisfied with the construction of infrastructure such as charging piles and charging stations for EVs at this stage. The charging problem directly affects the battery range, and consumers are more concerned about the convenience brought by the charging policy compared to the risk brought by the charging policy to them.

(4) Subjective norms significantly affect consumers' perceived value, while the effect on perceived risk is relatively weak, with a path coefficient of 0.02. Most consumers listen to the opinions and suggestions of people they trust, such as family members, relatives, and friends, when purchasing an electric vehicle. The credibility of the advice given by the most trusted people around them increases, and their advice can also reduce consumers' concerns about risks.

(5) Both perceived value and perceived risk significantly affect consumers' willingness to consume, with perceived value positively affecting willingness to consume and perceived risk negatively affecting willingness to consume. The path coefficient of perceived value is as high as 0.813, which indicates that consumers' perception of the value of electric vehicles affects their purchase decision and has a greater weight. It is obvious that the stronger the consumer's perception of risk is, the lower the consumer's willingness to purchase follows.

5. Conclusion and Insights

5.1. Research findings

This paper uses the SOR structural model to investigate the factors influencing the purchase intention of electric vehicle consumers and concludes that ① Product attributes and environmental perception level bring more perception of risk to consumers, which means that product attributes and consumers' environmental perception will not enhance consumers' willingness to purchase new energy electric vehicles, and improving product performance and reducing environmental pollution in the production process will enhance consumers' willingness to consume. ② Charging policies and subjective norms have a significant impact on consumers' willingness to purchase through consumers' perceived value and perceived risk, especially subjective norms. Subjective norms can influence consumers' purchase intentions psychologically through the suggestions of people closest to consumers, and the completeness of charging policy is the focus of consumers' attention, so improving charging policy can help to enhance consumers' purchase intentions. ③ From the analysis results, consumers pay more attention to the perceived value of electric vehicles compared to the perceived risk.

5.2. Insightful Recommendations

Based on the above study, this paper makes the following recommendations:

(1) Electric vehicle enterprises should focus on the performance of new energy electric vehicles, as well as the quality of hardware workmanship. The performance and quality of the product can be intuitively felt by consumers,

and the hardware workmanship of the product directly affects the experience of consumers. The improvement of product attributes can reduce the risk perception of consumers to a certain extent.

(2) Manufacturers as well as R&D departments should tighten the production process of electric vehicles, optimize the production process, and promote the development of power batteries. Minimize the pollution caused by electric vehicles to the environment to the maximum extent to satisfy consumers. At the same time, the government should join hands with enterprises to strengthen environmental protection propaganda to social groups, enhance the concept of consumer propaganda, and strengthen consumers' concept of environmental protection, thus promoting consumers' awareness of electric vehicles.

(3) Vehicle enterprises should accelerate the construction of electric vehicle infrastructure such as charging piles and charging base stations in conjunction with relevant departments. At the same time, there should be dedicated personnel to manage and maintain the charging infrastructure to minimize its safety hazards. The charging policy should also be improved in time, and the government should increase the financial subsidies for charging policy.

(4) Sellers should use subjective norms to influence consumers for sales advertising and marketing strategies so as to attract consumers' attention, promote consumers' own promotion of electric vehicles, and thus enhance consumers' willingness to purchase.

References

- [1] Jia L. National Development and Reform Commission: The development of new energy vehicles in our country enters a comprehensive marketization development period [N]. *China Metallurgical News*, 2022-09-27(004)
- [2] Zhang Y. New energy vehicles can play an important role under the "double carbon" goal [J]. *New energy science and technology*, 2021(09):7-9+23.
- [3] Zhang L. Current situation and development prospect of China's New energy Vehicle export in the New era [J]. *Price Monthly*, 2022(07):89-94.DOI:10.14076/j.issn.1006-2025.2022.07.13.
- [4] Zhang Fan et al. Analysis of Influencing Factors of New Energy Vehicle Satisfaction Based On Scenario Thinking and Catboost Model[J]. *IOP Conference Series: Earth and Environmental Science*, 2021, 769(4)
- [5] EGBUE O, LONG S. Barriers to Widespread Adoption of Electric Vehicles: An Analysis of Consumer Attitudes and Perceptions [J]. *Energy Policy*, 2012, 48 (3):717-729.
- [6] Zhao F, Liu Z, Cheng X. Research on the Change of Government Role to ensure the sustainable development of new energy automobile industry [J]. *Science and Technology Management Research*, 2018, 38(04):54-58.
- [7] Zhang Y, Wang N, Yang X et al. Application Situation and Management Suggestions of electric vehicle charging Pile -- Taking Shijiazhuang City as an example [J]. *China Statistics*, 2019(09):71-74.
- [8] Wang X, Li J, Wang Y. Research on Sustainable Use Intention of new energy Vehicle Users [J]. *Journal of Information Resources Management*, 2017, 7(02):40-49. DOI:10.13365/j.jirm.2017.02.040.
- [9] MEHRABIAN A, RUSSELL J A. An approach to environmental psychology [M]. Cambridge, MA: The MIT Press, 1974:62-65.
- [10] Russell W. Belk. Situational Variables and Consumer Behavior [J]. *Journal of Consumer Research*, 1975, 2(3):157-164.
- [11] Li Q, Li X, Wei X. Research on Consumer Community Group-buying Integrating SOR and Promise Trust Theory [J]. *Journal of Xi 'an Jiaotong University (Social Science Edition)*, 2020, 40(02):25-35. DOI:10.15896/j.xjtuskb.202002004.
- [12] Li L, Luo B, Sun Y et al. A study on the influence mechanism of green Advertising on consumers' Intention to buy energy-saving Products: Based on SOR Model [J/OL]. *Journal of University of Science and Technology of China*, 1-21 [2022-10-26]. <http://kns.cnki.net/kcms/detail/34.1054.n.20210621.1139.012.html>.
- [13] Brian Caulfield and Séona Farrell and Brian McMahon. Examining individuals preferences for hybrid electric and alternatively fuelled vehicles [J]. *Transport Policy*, 2010, 17(6):381-387.
- [14] Ona Egbue and Suzanna Long. Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions [J]. *Energy Policy*, 2012, 48:717-729.
- [15] Shi H, Zhou W, Xu Y. Research on New energy Vehicle Market Based on Green Technology: a Case study of Weihai [J]. *Science and Technology Management Research*, 2014, 34(08):227-232.
- [16] Yang X. The Influence of Price setting Factors on the Purchase Intention of Consumers: Based on the network presale environment [J]. *Commercial economic research*, 2017, (18): 30-32.
- [17] Li Z, Zhang Z, Zhang L. Study on the Influence of Environmental and Psychological Factors on the Purchasing behavior of new energy vehicles in Chinese urban residents: Focusing on Tianjin [J]. *Industrial engineering*, 2021, 24 (01): 104-110.
- [18] Zhu C, Deng Y. Study on Influencing Factors of purchase intention of new energy vehicles in Ningbo City [J]. *Modern Commercial Industry*, 2021, 42(03):25-26.
- [19] Lin He and Wei Chen and Guenter Conzelmann. Impact of vehicle usage on consumer choice of hybrid electric vehicles [J]. *Transportation Research Part D*, 2012, 17(3):208-214.
- [20] Liu Y, Wang J, Ari K. Policy and business model innovation of electric vehicle demonstration operation: global experience and practice in China [J]. *Chinese Soft Science*, 2014(12):1-16.
- [21] Wang C, Yang W, He C et al. Government promotion Policy and Consumer Purchase Intention of new energy vehicles: An empirical study from Xi 'an [J]. *Soft Science*, 2021, 35(07):38-44. DOI:10.13956/j.ss.1001-8409.2021.07.06.
- [22] Yin Z, Chen J. Business Model Selection Strategy for electric Vehicles in China Based on Consumer Preference [J]. *Shanghai Management Science*, 2013, 35(06):25-29.
- [23] Li Z, Xu X, Li L. Research Report on fiscal and tax incentive Policies of new energy automobile Industry [J]. *Chinese Market*, 2020(26):197-198. DOI:10.13939/j.cnki.zgsc.2020.26.197.
- [24] Li C, Ye L, Wang L. The Influence of New energy Vehicle Consumption Promotion Policy on Potential consumers' Purchase Intention [J]. *China Management Science*, 2021, 29(10):151-164. DOI:10.16381/j.cnki.issn1003-207x.2019.1845.
- [25] TERRY LAM, CATHY H C HSU. Theory of Planned Behavior: Potential Travelers from China [J]. *Journal of Hospitality & Tourism Research*, 2004, 28(4):463-482.
- [26] Xu G, Xu F. Research on Influencing Factors of New Energy Vehicle Purchase Decision [J]. *China Population, Resources and Environment*, 2010, 20(11):91-95.
- [27] She J, Li M, Liu J. An Empirical Study on Factors Influencing consumers' Purchase Decision of pure electric Vehicles [J].

- Industrial Engineering and Management, 2014,19(02):15-20+27.DOI:10.19495/j.cnki.1007-5429.2014.02.004.
- [28] Xue H. Research on Promotion Mechanism and Policy of Public Ecological consumption Pattern -- A case study of New energy Vehicles [J]. Journal of China University of Petroleum (Social Science Edition), 2017,33(02):23-30.DOI:10.13216/j.cnki.ujpejess.2017.02.0004.
- [29] Wang J, Wang L, Wang M. Online word-of-mouth, Perceived Value and Consumer Purchase Intention: an Empirical study [J]. Journal of management engineering, 2019,33(04):80-87.DOI:10.13587/j.cnki.jieem.2019.04.009.
- [30] Arora Nupur and Manchanda Parul. green perceived value and intention to purchase sustainable apparel among Gen Z: The moderated mediation of Green perceived value and intention to purchase sustainable apparel among Gen Z: The moderated mediation of attitudes[J]. Journal of Global Fashion Marketing, 2022, 13(2) : 168-185.
- [31] Bauer R A. Consumer behavior and risk taking, in Dynamic Marketing for a Changing World [M].Chicago:American Marketing Association,1960.
- [32] Nena Lim. Consumers' perceived risk: sources versus consequences [J]. Electronic Commerce Research and Applications, 2003, 2(3) : 216-228.
- [33] Chen K, Gu R, Hu J. Research on Purchase Intention of New energy Vehicles based on perceived Benefit-Perceived Risk framework [J]. Journal of Nanjing University of Technology (Social Sciences Edition), 2019,18(02):61-70+112.
- [34] Yin J, Zhang Z, Liao G et al. Research on Consumers' Purchase Intention of new energy Vehicles based on Technology Acceptance Model and Perceived Risk Theory [J]. Forecast, 2019,38(06):83-89.
- [35] Fan H, Ye N, Zhang M. Customer satisfaction analysis of new energy vehicles based on multi-source data [J/OL]. Operation and Management:1-11[2022-10-28].DOI:10.16517/j.cnki.cn12-1034/f.20220624.001.
- [36] Yang X, Zhou Y. Green Value: A New dimension of Customer Perceived Value [J]. China Industrial Economy, 2006(07):110-116.DOI:10.19581/j.cnki.ciejournal.2006.07.015.
- [37] Yang W. Research on the Influence of Consumer Environmental Values on the Purchase Intention of New Energy Vehicles [D]. Anhui University of Technology, 2018.
- [38] Paul C. Stern, Thomas Dietz, Troy Abel, Gregory A. Guagnano and Linda Kalof, A Value-Belief-Norm Theory of Support for Social Movements:The Case of Environmentalism[J]. Human Ecology Review, 1999,6(2):81-97.
- [39] Ge J. The main body of the policy network of charging facilities supply for new energy vehicles and its interactive relationship [J]. Enterprise Economics, 2013(10):162-166. doi:10.13529/j.cnki.enterprise.economy.2013.10.005.
- [40] Jillian C Sweeney and Geoffrey N Soutar. Consumer perceived value: The development of a multiple item scale [J]. Journal of Retailing, 2001,77(2) :203-220.
- [41] Wang Y, Li Y. An empirical study on Consumers' Purchase Intention of new energy Vehicles based on perceived risk and human involvement [J]. Mathematical Statistics and Management, 2013,32(05):863-872.DOI:10.13860/j.cnki.sltj.2013.05.010.
- [42] Richard P. Bagozzi and Kam-Hon Lee and M. Frances Van Loo. Decisions to donate bone marrow: The role of attitudes and subjective norms across cultures The role of attitudes and subjective norms across cultures [J]. Psychology & Health, 2001, 16(1) : 29-56.
- [43] Yu, Y, Dai J, Li X et al. Study on reliability and validity of Health and Safety Climate Scale [J]. Environmental and Occupational Medicine, 2021,38(11):1214-1218.DOI:10.13213/j.cnki.jeom.2021.21180.
- [44] BACON D R, SAUER P L, YOUNG M. Composite reliability in structural equations modeling [J]. Educ Psychol Meas, 1995,55(3): 394-406.
- [45] Bentler, P. M. and Bonett, Douglas G.. Significance tests and goodness of fit in the analysis of covariance structures.[J]. Psychological Bulletin, 1980, 88(3) : 588-606.