
Analysis of Marketing Performance Using Purchase Intention and Purchase Decision (Case of Electric Vehicles in China)

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Abstract – Among the negative effects of modern society, global warming is a major problem. It is especially important for countries to realize that reducing greenhouse gas emissions through the transition to electric vehicles. Therefore, this study aims to analyze the factors that affect the purchase intention of electric vehicles. This study utilized quantitative research by SPSS to analyze multiple linearity and other analysis through the 252 questionnaires collected. The Chinese respondents in the study all met the screening criteria of having owned or driven an electric vehicle. It was found that among the four independent variables function value (FV), price (P), brand trust (BT), and attitude (A), only the variable price did not have a significant effect on the dependent variable purchase intention (PI). Consistent with previous research findings, purchase intention (PI) continues to have a positive effect on purchase decision (PD).

Keywords: Purchase Intention; Function Value; Price; Brand Trust; Attitude; Electric Vehicles

Introduction

The development of time drives the progress of science and technology, and at the same time it also brings about the deterioration of the environment. People are gradually realizing how their environment is going downhill. The traditional automobile industry has played a considerable role in the promotion of air pollution. Hundreds of millions of Chinese citizens live in places where polluted air, particle pollution, and hazardous chemicals are a great concern(Xie et al., 2021). According to previous investigations, those who are exposed to specific air pollutants at high enough concentrations can develop a variety of health issues(Shahriyari et al., 2021). The research shows that PM 2.5 pollution can be significantly reduced by the adoption of electric vehicles(Wu et al., 2023). As a result, all governments throughout the world are promoting the green transformation of the vehicle sector as a strategic growth strategy.

Just on the eve of the removal of China's COVID-19 control policy, the country issued a document ending subsidies for the purchase of new energy vehicles on 31 December 2022, signaling a shift from a policy-driven to a market-driven industry. According to the Wall Street Journal, China's combined retail sales of passenger cars fell nearly 20% in January-February this year, highlighting the challenges automakers face in the world's number one car auto market, which has been experiencing a chronic lack of momentum(*China Passenger Car Sales Slump After Epidemic Prevention Policies Are Abolished* - WSJ, n.d.). According to the China Association of Automobile Manufacturers (CAAM) report, yield and sales in March 2023 once again showed anomalous deviations (Table 1.1), with the expected end-of-season sales rush to clear inventory in March not materializing, pointing to the car price war that has disrupted the market since March, with sales climbing in March suffering setbacks and failing to keep up with production speeds.

Table 1. Sales and yield of China's NEVs

Month \ Year	2019		2020		2021		2022		2023	
	Sales	Yield	Sales	Yield	Sales	Yield	Sales	Yield	Sales	Yield
1	9.6	9.1	4.6	4.3	17.9	19.4	43.1	45.2	40.8	42.5
2	5.3	5.9	1.3	1.0	11.0	12.4	33.4	36.8	52.5	55.2
3	12.6	12.8	5.3	5.0	22.6	21.6	48.4	46.5	65.3	67.4
4	9.7	10.2	7.2	8.0	20.6	21.6	29.9	31.2		
5	10.4	11.2	8.2	8.4	21.7	21.7	44.7	46.6		
6	15.2	13.4	10.4	10.2	25.6	24.8	59.6	59.0		
7	8.0	8.4	9.8	10.0	27.1	28.4	59.3	61.7		
8	8.5	8.7	10.9	10.6	32.1	30.9	66.6	69.1		
9	8.0	8.9	13.8	13.6	35.7	35.3	70.8	75.5		
10	7.5	9.5	16.0	16.7	38.3	39.7	71.4	76.2		
11	9.5	11.0	20.0	19.8	45.0	45.7	78.6	76.8		
12	16.3	14.9	24.8	23.5	53.1	51.8	81.4	79.5		

Monthly data on sales and yield of new energy vehicles in China (In units of ten thousand): sales over yield marked in red

Source: China Association of Automobile Manufacturers (CAAM) report

According to the findings from study of (Haitao, 2022), it can be seen that purchase decisions have an impact on market performance of about 47%. Moreover, this only means that the success rate of the process during the transition from willingness for a purchase to a purchase decision is only 47%. Therefore, this study will also study whether consumers who are willing to buy electric vehicles will actually make a purchase decision. The company's whole marketing effort procedure yields an indicator of success known as marketing performance (Mone et al., 2013). In order to achieve the ideal market performance, the sales staff must know the types of consumers' purchase intention so as to determine the marketing strategy more accurately (Haitao, 2022). Based on the above considerations, this study will divide the research model into two parts. This study is focused on investigating the relationship between function value, price, brand trust, attitude, and the tendency of customers to purchase electric vehicles. Additionally, it examines how consumers' purchasing intentions influence their choice to make a purchase. The objective of the research is to provide insights for promoting the use of electric vehicles and decrease traffic-related greenhouse gas emissions.

Literature Review

Function value

Sheth et al. (1991) in Consumption value theory states that the functional value refers to one's logical and economical assessments of the utility of applying a good or service. The specifications or conveniences of an item of commerce or services that satisfy what the customer wants in the sense of functioning or usability are referred to as its function value (Jiang, 2016). Meanwhile, Sierzechula et al. (2014) investigated the attitude-action gap among American customers in relation to environmentally friendly vehicles and showed that function value has a significant effect on buyers' mindsets and actions regarding purchases.

Price

Marcal et al. (2020) describe price to the sum of funds sought for particular products or services. Whereas price is also described as the total of all the values that customers are altering for the profit of owning or using a particular goods as well as customer experience (Zietsman et al.,

2019). Price, according to (Dhurup et al., 2014), additionally involves an association with whether customers think a product's price is unreasonable, unreasonable, or fair, as this eventually influences customers' inclination to purchase the item..

Brand trust

Brand trust was stated to be a buyer's eagerness to place their faith upon a brand in a context of unpredictability because they believe the brand will yield results that are beneficial(Cuong, 2020). According to Howard & Sheth, (1970), who believed that trust represented one of the elements impacting purchase intention, the idea of brand trust initially came forth. They presume that trust and intention for purchasing are closely associated. In addition to this, Bennett and Harrell (1975) assert trust significantly influences an individual's probability of making a decision to buy. As stated by Komalasari et al. (2021), trust represents a consumer's willingness to rely on and have faith in the goods or services, as well as in commitments or info. Additionally, reliability, great services, expertise and technological competency, sincerity, and integrity are all indicators of trustworthiness.

Attitude

As defined by The Theory of Planned Behavior(Ajzen, 1991), attitude implies how much an individual is in favor or against of the behavior of concern. It includes taking into consideration how the behavior will turn out. The results of the investigation demonstrated that attitude significantly mediates the link with intention to buy(Nazir & Tian, 2022). According to Peters & Dütschke (2014), who conducted research into the acceptance of electric vehicles, an individual's perspective determines how they would perceive an electric vehicles features, whether those features either economical nor technological. Attitude tend to be cumulative evaluations, unlike intentions. On the opposite hand, intentions show the driving behavior behind an individual's consciously chosen and deliberate behaviors(Spears & Singh, 2004).

Purchase intention

The intention to purchase can be summed up as an intense desire to purchase something, and it is a component of the pathway that ultimately contributes into a client's purchasing behavior (Sinulingga & Richard, 2021). Based on published definitions, purchase intention refers to a client's willingness to place an order with a merchandiser(Sari & Kusuma, 2014). It is a decision-making habit that investigates why customers purchase a certain brand(Mirabi et al., 2015). Purchase intention may alternatively be described as the tendency to acquire a specific goods under specific circumstances. It is a measure of eagerness to gain something, is used to determine the possibility that a consumer would purchase the goods or services(Raza et al., 2014).

Purchase decision

In the research of Komalasari et al. (2021), the term "purchase decision" is used to describe the procedure of choosing, being utilized, and recognizing a good or service. During this stage, the customer will investigate to earn further details about the product, consider buying it, make the decision to buy it, and then express feelings of fulfillment with the decision. Similarly, customers decide on their purchase choices by looking for factors that avoid increased risk, and customers will make their final decisions by drawing on information and balancing alternatives,

etc (Kotler & Armstrong, 2011). A variety of factors, consisting of accessibility of the product, promotions for rival items, an insufficient amount of readily accessible money, and fellow consumer viewpoints, might cause the product decision to alter at the exact moment of buying (Pickett-Baker & Ozaki, 2008).

Hypotheses

In previous studies related to electric vehicle purchase intention, function value in customers' perceived value is frequently included in studies as one of the essential research variables. Before consumers choose to purchase a good, it is essential to measure the functional characteristics and the benefits it provides. Previous studies have more often determined the significant effect of function value on purchase intention. S. Jiang, (2016)'s results showed the positive impact of function value on purchase intention. This means that the higher the function value of electric vehicles, the higher the consumer's intention. Meanwhile, Sierzechula et al. (2014) investigated the attitude-action gap among American customers in relation to environmentally friendly vehicles and showed that function value has a significant effect on buyers' mindsets and actions regarding purchases.

H₁ : Function value has significant influence toward purchase intention of electric vehicles in China.

In this study, price is incorporated into the research model. Previous studies pay more attention to consumers' perception information, whether it is benefit or risk. Whether the price of electric vehicles is reasonable or not will be a key influence on the final decision of customers. In the research of (Bai & Tan, 2021), the regression coefficient of price is negative, which indicates that price or use cost has opposite or offset relationship with purchase intention. Meanwhile, the research by Xu et al. (2019) found no significant effect of price value on customers' purchase intention.

H₂ : Price has significant influence toward purchase intention of electric vehicles in China.

Yang et al. (2020) stated in research that brand has the potential to boost customer views of the positive attributes of electric cars, increase consumer interest in electric vehicles, and affect customers' eventual intentions to buy. According to the investigation, 65% of clients switched brands for the reason their actual interaction with the company fell short compared to what the business's advertising claimed. If the client believes that the transaction did not measure up against their expectations, consumers who are younger in particular are more likely to depart.

H₃ : Brand trust has significant influence toward purchase intention of electric vehicles in China.

The relationship between attitude and purchase intention has been measured in many studies, and many models based on attitude as an indicator have been established. Attitude can be considered as the behavior of the customer to sift through the information and consider the consequences of the action before making a decision. By the research from Zang et al. (2022), they claimed that attitude as a good predictor, it has been confirmed there is a strongly influence on purchase intention. Furthermore, attitudes have a significant impact on how consumers think and act. This implies that a company should consider every aspect that might improve client attitudes considering attitudes directly affect whether or not to make a purchase.

H₄ : Attitude has significant influence toward purchase intention of electric vehicles in China.

According to the research from Ang (2021), the three main variables - price, brand aftersales and product factors - have varying degrees of influence on the purchase intention of new energy vehicles, with the variables related to product performance having the greatest influence. Nevertheless, according to Yang et al. (2020)'s research, the results show that brand trust is the most influential factor in consumers' purchase intentions, followed by attitude. According to the report, in real-life transactions, consumer performance may not be based solely on the functional value of a product and brand trust. In order to measure the final market performance more precisely, this study examines whether function value (FV), price (P), brand trust (BT) and attitude (A) also have a positive effect on purchase intention (PI)

H₅ : Function value, price, brand trust, attitude simultaneously have significant influence toward purchase intention of electric vehicles in China.

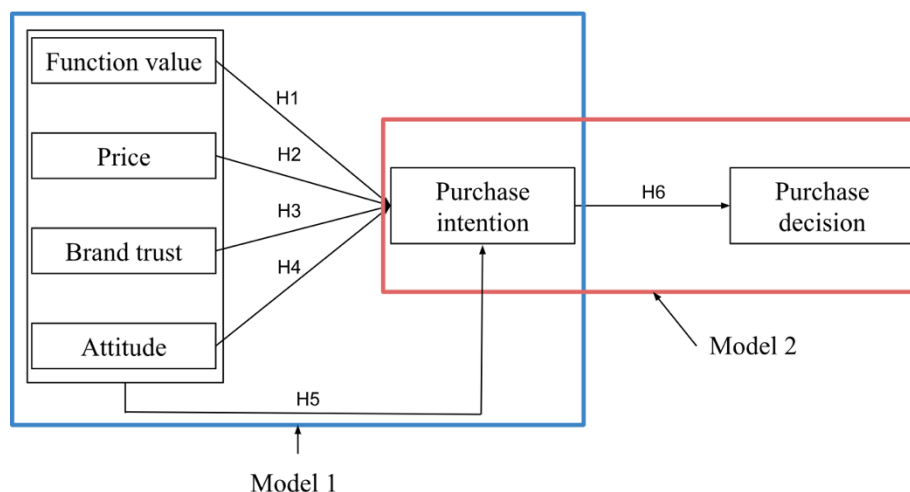
The transition from purchase intention to purchase decision occurs when consumers' interests, desires and beliefs are transformed into actual purchase actions. Purchase intention, among the numerous elements influencing consumers' actual choices, mostly affects the probability that they are going to make a decision to buy. The results of Manutworakit & Choocharukul (2022)'s research has also indicated that there is a powerful positive relationship between purchase intention and actual purchase decision. Therefore, this study examines how a high intention to purchase an electric vehicle affects the final decision.

H₆ : Purchase intention of electric vehicles has significant influence toward purchase decision of electric vehicles in China.

Research framework

With the objective to determine whether the dependent variable purchase intention (PI) has an effect on (PD), this study shall employ four independent variables (figure 2.1): function value (FV), price (P), brand trust (BT), and attitude (A). In the interim, researchers are going to investigate the influence and connection between purchase intention and purchase decision (PD).

Figure 1. Theoretical Framework



Source: constructed by Researcher (2023)

Research gap

According to the research of Yang et al. (2020) by using AMOS, brand trust has a more significant effect upon consumers' ultimate decisions regarding the purchase of electric vehicles than consumer attitudes. Nevertheless, just the perceived advantages were utilized as one of the parameters in their research; the actual price of an electric vehicle was not included in this review. According to the research conducted by Ang (2021) using SmartPLS, it proved that the performance of the product is the dominant factor affecting the purchase intention. But during the economy downward people are looking for cars with lower costs. Wang et al. (2022) used SPSS and validated the argument that functional values have a remarkable influential effect on attitudes through the emotional value of certain purchase behaviors. Xu et al. (2019) analyzed data by SPSS and concluded that consumers' attitude has a significant impact on their consideration of purchasing electric vehicles, while the impact of price on purchase intention is not significant.

Taken together, previous studies have shown that function value, price, brand trust and attitude correspondingly have an impact on the NEVs and EVs purchasing intention of Chinese consumers, and these four factors' affection do exist. However, previous studies have not clearly pointed out whether and to what extent these four variables will still affect the purchasing power of EVs after the COVID-19 epidemic. This is also one of the main purposes of this study, and the previous study did not have such a premise. Therefore, Chinese consumers will be selected as the research sample. Hence this study identifies the next research gaps based on the above literature review table. The main research gaps identified in this study are that most of the previous research has tended to analyze new energy vehicles and has not broken down into electric vehicles, the reason for this is that new energy vehicles include hybrid vehicles, which include fuel as a driving energy source, and that means hybrid vehicles has the potential to emit more pollutants than electric vehicles. Therefore, this study decided to apply plug-in electric vehicles as the main subject of the study, with the purchase intention of customers as the research purpose.

Research Method

For the following methodology, the current investigation is going to utilize quantitative method. To confirm whether they are eligible to continue completing the survey, respondents who align with the research criteria must also answer the initial screening inquiries. In this study, snowball non-probability sampling will be used. For investigators using non-probability sampling approaches to conduct surveys in real-life situations is more advantageous and useful. The sample size is usually calculated by multiplying the quantity of indicators by 5 or 10, with the outcome being a minimum of five times the total quantity of indicators, as stated by Hair et al. (2010). For the purpose of trying to arrive at a sample size that was approximate to the research's 25 indicators, the sample size is calculated through multiplying the total number of indicators by the minimum number of samples (5 times), yielding a sample size of $(25 \times 5 = 125)$. 250 respondents comprised the sample size in the present research, which is more than the required minimum sample size of 125. Meanwhile, the following research criteria were used to screen specific respondents who met the criteria:

1. Respondents who need to be Chinese citizens
-

2. Respondents who own an electric vehicle
3. Respondents who have driven an electric vehicle

Screening questions, respondent profiles, and statements of questions with 5-point Likert scales that were fit to the characteristics of respondents after the validity and reliability tests were distributed to samples who were assumed to be an electric vehicles user/buyer, former user/buyer, or prospective buyer. The five levels of agreement: strongly agree, agree, neither agree nor disagree(neutral), disagree, and strongly disagree, from 5 to 1.

SPSS version 26 will be used as the statistical tool for all of the following analyses. Meanwhile, descriptive research will be applied in the following part of this study by using SPSS. Analysis techniques used in descriptive statistics include data collection, processing, aggregation, graphical representation, generalization, and evaluation. Not only that, In this study, SPSS will also be used for classical assumption test(include normality test and multicollinearity test), multiple linear regression test, T test and F test.

Results And Discussion

This study will comprise analysis of minimum, maximum, mean and standard deviation for all independent and dependent variables. The following table illustrates the output of the SPSS descriptive analysis(table 2).

Table 2. Descriptive Analysis

Variable	N	Min	Max	Mean	Std. Deviation
FV1	252	1	5	4.07	1.035
FV2	252	1	5	4.11	0.998
FV3	252	1	5	4.04	1.167
FV4	252	1	5	4.1	1.17
FV5	252	1	5	4.06	1.08
P1	252	1	5	3.97	1.206
P2	252	1	5	4.07	1.132
P3	252	1	5	4.05	1.183
P4	252	1	5	4.01	1.159
BT1	252	1	5	4.14	1.104
BT2	252	1	5	4.06	1.088
BT3	252	1	5	4.05	1.151
BT4	252	1	5	4.09	1.031
BT5	252	1	5	4.09	1.075
A1	252	1	5	4.08	1.121
A2	252	1	5	3.98	1.214
A3	252	1	5	4.13	1.084
A4	252	1	5	4.12	1.113
PI1	252	1	5	4.2	1.042
PI2	252	1	5	4.03	1.125
PI3	252	1	5	4.1	1.074
PI4	252	1	5	4.07	1.122
PD1	252	1	5	4.04	1.109
PD2	252	1	5	4.08	1.057
PD3	252	1	5	4.06	1.155

Source: Statistical Software, conducted by Researcher (2023)

Classical assumption test

Normality test

A statistical histogram's form can be used to visually determine whether or not it conforms to a certain distribution, including a normal distribution. If the graph exhibits a bell-shaped appearance, normality can frequently be assumed. The model in this study is considered to be normally distributed due to as demonstrated by figures 2 and 3, both the model with purchase intention as the dependent variable and the model with purchase decision as the dependent variable display a bell-shaped distribution.

Figure 2. histogram with purchase intention as dependent variable

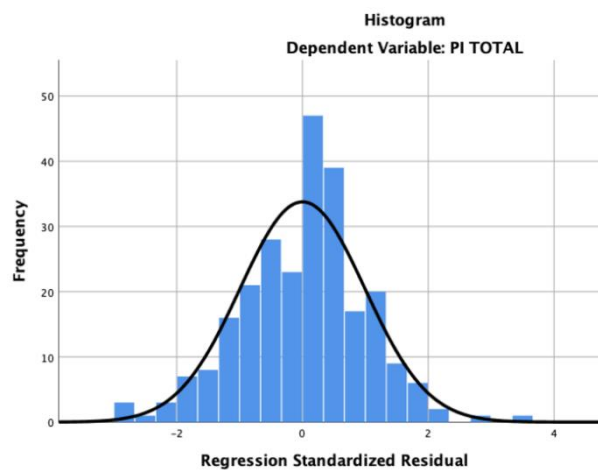
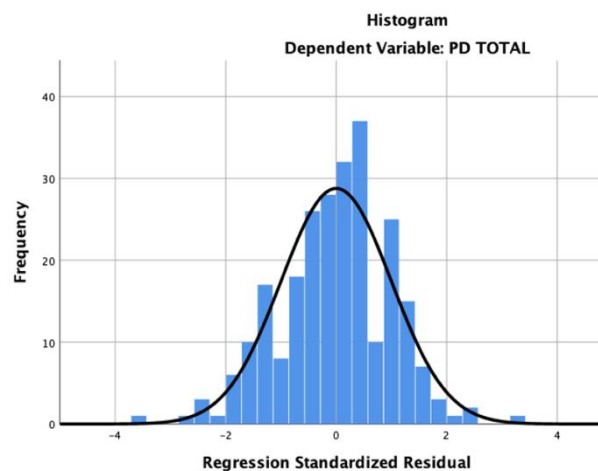


Figure 3. histogram with purchase decision as dependent variable



Source: Statistical Software, conducted by Researcher (2023)

The plotted points in the "Normal P-P Plot of Regression Standardized Residual" typically align and are close to the diagonal, as can be seen from the output of figures 4 and 5 below. Therefore, it is straightforward to derive the conclusion that the residuals conform to a normal distribution when performing the probability plot approach normality test. As a result, the research's assumption of normalcy can be established.

Figure 4. normal p-plot with purchase intention as dependent variable

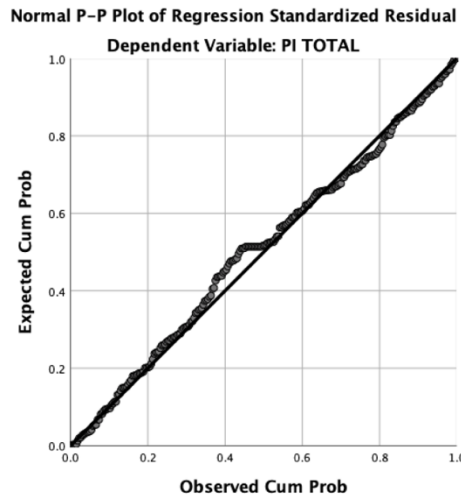
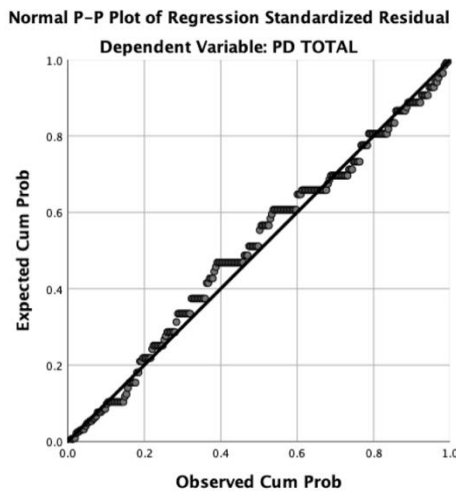


Figure 5. normal p-plot with purchase decision as dependent variable



source: Statistical Software, conducted by Researcher (2023)

Multicollinearity test

Criteria for decision making respecting Tolerance Values: There is no multicollinearity in the regression model if the Tolerance value is bigger than 0.10. Otherwise, multicollinearity exists. Criteria for making decisions on the basis of VIF values: The regression model fails to show multicollinearity if the VIF value is less than 10.00. Multicollinearity exists in the contrast. According to the above guidance, the test results output by table 3 and table 4 show that the tolerance values are all greater than 0.1 and the VIF values are all less than 10. Therefore, there is no multicollinearity in these two models.

Table 3. Multicollinearity test results model 1

Model	Collinearity Statistics	
	Tolerance	VIF
Function value	0.293	3.407
Price	0.229	4.37

Brand trust	0.26	3.852
Attitude	0.255	3.914

Table 4. Multicollinearity test results model 2

Model	Collinearity Statistics	
	Tolerance	VIF
Purchase intention	1.000	1.000

Source: Statistical Software, conducted by Researcher (2023)

F test

According to above (table 5), the F value is 183.484 with a significant value of 0.000. The outcome demonstrates that the significant level utilized 0.05, then F value is more than F table, which is 2.4082. It can be inferred that independent variables such as function value (FV), price (P), brand trust (BT), attitude (A) influence purchase intention (PI).

Table 5. F - test results of model 1

Dependent Variable: purchase intention (Y)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	2093.699	4	523.425	183.484	.000b
Residual	704.619	247	2.853		
Total	2798.317	251			

Source: Statistical Software, conducted by Researcher (2023)

Multiple linear regression

Table 5. Multiple linear regression results model 1

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.722	0.593		1.218	0.224
Function value	0.323	0.049	0.388	6.587	0.000
Price	0.051	0.064	0.053	0.795	0.427
Brand trust	0.264	0.053	0.313	4.997	0.000
Attitude	0.176	0.062	0.181	2.867	0.004

Dependent Variable: purchase intention (Y)

Source: Statistical Software, conducted by Researcher (2023)

Table 4.7 Multiple linear regression results model 2

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.516	0.534		4.711	0
PI TOTAL	0.59	0.032	0.76	18.475	0

Dependent Variable: purchase decision (Y)

Source: Statistical Software, conducted by Researcher (2023)

Influence of the function value toward purchase intention

The results of the researcher's statistics on the effect of function value on purchase intention are consistent with the research of S. Jiang (2016) The results of the t-test indicated that function value significantly influenced purchase intention. Function value had a significant level of 0.000 at a t-count value of 6.587, which is less than the significant level of 0.05. The coefficient value in the linear regression was 0.323. has a positive effect on purchase intention and can be a factor to increase purchase intention by 32.3%.

Influence of the price toward purchase intention

The results of the researcher's statistics on the effect of price on purchase intention are consistent with the research of Bai et al. (2021) and Xu et al. (2019). The results of the t-test indicated that price had a significant effect on purchase intention, with a significance level of 0.427 at a t-count of 0.795, which is greater than the significance level of 0.05. The coefficient value in the linear regression is 0.051. The above results indicate that price has a positive but small effect on purchase intention and can be a factor in increasing purchase intention by 5.1%.

Influence of the brand trust value toward purchase intention

The results of the researcher's statistics on the effect of brand trust on purchase intention are consistent with the research of Yang et al. (2020). The results of t-test indicated that brand trust significantly influences purchase intention. brand trust has a significant level value of 0.000 at t count value of 4.997, which is less than the significant level value of 0.05. In the result of linear regression, the coefficient value is 0.264. The above results show that brand trust has a positive effect on purchase intention and can be a factor that increases purchase intention by 26.4%.

Influence of the attitude toward purchase intention

The results of the researcher's statistics on the effect of attitude on purchase intention are consistent with the research of Xu et al. (2019) and Zang et al. (2022), (Yang et al., 2020). The results of t-test indicated that attitude has a significant effect on purchase intention. attitude has a significant level value of 0.000 at t-count value of 18.475, which is less than the significant level value of 0.05. In the result of linear regression, the coefficient value is 0.176. The above results show that attitude has a positive effect on purchase intention and can be a factor that increases purchase intention by 17.6%.

Influence of the function value, price, brand trust, attitude toward purchase intention

According to above (table 4.10), the F value is 183.484 with a significant value of 0.000, which is more than F table 2.4082. It can be inferred that independent variables such as function value (FV), price (P), brand trust (BT), attitude (A) simultaneously influence purchase intention (PI). Therefore, H5 is accepted.

Influence of the purchase intention toward purchase decision

The results of the researcher's statistics on the effect of purchase intention on purchase decision are consistent with the research of Manutworakit & Choocharukul (2022). The result of t-test indicated that purchase intention significantly influences purchase decision. purchase intention has a significant level value of 0.004 at t count value of 2.867, which is less than the significant level value of 0.05. The coefficient value in the result of linear regression is 0.59. The above results indicate that purchase intention has a positive effect on purchase decision and can be a factor that increases purchase intention by 59%.

Conclusion

Based on the results of the test outputs, the researcher can conclude that: Function value has a positive and significant influence on purchase intention in China. Price have influence but not significant on purchase intention in China. This implies that consumers will consider price orientation when purchasing electric vehicles, but whether the price of electric vehicles is high or low will not significantly affect consumers' purchase intentions. Brand trust has a positive and significant influence on purchase intention in China. Attitude has a positive and significant influence on purchase intention in China. It implies that the stronger the attitude of consumers, the stronger the intention of consumers to purchase electric vehicles. Function value, price, brand trust, attitude simultaneously have significant influence toward purchase intention of electric vehicles in China. Purchase intention has a positive and significant influence on purchase decision in China. Companies for both Chinese and international electric car manufacturers ought to persist in boosting customer trust in the brand and their utilization of the products they produce. even though there may be more internal or external elements that eventually affect the willingness of consumers to purchase, the customer's general impression of the product also plays a significant role. Governments additionally need to continue integrating greater diversity of consumer subsidies and incentives, which may further influence consumers' willingness to buy. For future researchers should devote more consideration to how demographic aspects, such as age and monthly income, have a final impact the decisions made by customers.

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