

The Relationships Among Green Brand Image, Green Trust, Green Perceived Value and Green Purchase Intention for Tesla Electric Vehicles in Taiwan

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Abstract

At present, businesses are becoming increasingly aware of environmental sustainability as an attribute to success. This study aims to investigate the relationships among green brand image, green trust, green perceived value and green purchase intention, specifically focusing on the case study of Tesla electric vehicles in Taiwan. To verify the hypotheses, data from 225 respondents was obtained in the form of survey questionnaires. The data was then analyzed using reliability test, validity test, confirmatory factor analysis (CFA) and structural equation modeling (SEM). The results indicate that both green brand image and green trust have a positive impact on green perceived value; green brand image has a positive effect on green trust and green perceived value has a positive influence over green purchase intention. We suggest that businesses in the electric automotive industry should not only market their products as environmentally friendly, but should place emphasis on the uniqueness and innovative attributes of the product. Additionally, partaking in environmentally friendly practices or side projects and making them known to consumers can also help build a positive green brand image, increasing their overall trust and perceived value in the product which heightens the willingness of consumers to purchase it.

Keywords: Green brand image, green trust, green perceived value, green purchase intention, Tesla electric vehicles

1. Introduction

Today, more and more businesses regard environmental sustainability as a critical factor to success (Parguel et al., 2011). 85% of global consumers believe they have been changing their purchasing habits to make 'greener' decisions in the past five years. Additionally, more than a third of consumers are willing to pay more for environmentally friendly and sustainable alternatives (Business Wire, 2021).

The transport sector is infamous as a primary contributor to carbon dioxide emissions and thus global warming due to the manufacturing process and fuel consumption of vehicles. According to the statistical data from Taiwan Environmental Protection Administration, Taiwan's transportation accounted for 14.17% of the country's carbon emissions in 2020, second in line to industrial emissions (48.74%). Introducing electric vehicles would allow Taiwan's major cities to reduce pollution by up to 60% (Li et al., 2016). Many businesses in the automotive industry have identified the heightened demand and have since developed and promoted such products in the form of electric, hybrid, diesel, and biodiesel vehicles. Currently, aligned with the larger goal of achieving net-zero emissions by 2050, Taiwan's Ministry

of Economic Affairs (MOEA) has supported the electric vehicle (EV) industry through boosting supply capacities and building EV charging infrastructures. Of the numerous businesses in the automotive industry, Tesla is currently the leader in the market of electric vehicles, dominating with nearly 14% of the global market share as of 2022 (Patton, 2022). Tesla is successful in securing its growth as it adopts a green marketing strategy that places heavy emphasis on its high levels of innovation (Mangram, 2012).

Many studies have identified and investigated green brand image as an essential element in green markets and drew strong correlations between brand image and purchase intentions (Lien et al., 2015; Chen et al., 2018). Additionally, green trust has also been considered as having positive connections with purchase intentions and is essential in mediating consumption value and purchase intentions of green products (Amin & Tarun, 2020). In previous studies, environmentally friendly information and performance and attribute information are found to be positively associated with green perceived value of electric vehicles (Setiowati & Liem, 2018).

This study aims to explore the relationships among green brand image, green trust,

green perceived value and green purchase intention, specifically on Tesla in Taiwan. This study is expected to provide more understanding of green markets for businesses to devise effective market strategies for green products.

2. Literature Review and Research Hypotheses

2.1 Green Brand Image

A brand is any unique attribute associated with the products or services of one business, differentiating itself from that of others (Işoraité, 2018). Given that definition, brand image is the customer's subjective perception of a brand and a crucial point for customers when evaluating a product or service before making the purchase (Lien et al., 2015). The more positively the brand image is portrayed, the better the attitude toward the brand (Chen et al., 2018). Green brand image differs from brand image considering its specific focus on a brand's association to environmental sustainability (Chen et al., 2018). Thus, derived from the definitions above, this study defines green brand image as the customer's perception of the brand's green products in terms of its association with environmental benefits and environmental concerns.

2.2 Green Trust

Green trust has been defined in various ways previously. Hahm (2019) defined it as "a willingness to depend on a product, service, or brand based on the belief or expectation resulting from its credibility, benevolence, and ability related to its environmental performance." It has also been defined as "the belief in product, services, brands or firms that these could bring a positive impact on improving the environment" by Nguyen et al. (2020). This study adopts the definition for green trust: the belief in a product, service or brand based on its credibility, benevolence and ability related to its environmental performance, taking into account the product performance and the perceived firm performance.

2.3 Green Perceived Value

Chen et al. (2021) defined perceived value as a subjective judgment or overall evaluation obtained by consumers by perceiving the value of the product or service they purchase and balancing the 'profit and loss'. This study partially adopts the definition of green perceived value from the above: the subjective judgment or overall assessment made by consumers of the product based on weighing the tradeoff between perceived benefits (what is received) and perceived cost (what is lost). In previous studies, the most common assessments of perceived

value include functionality, innovation or novelty and social value or reputation (Chen et al., 2015; Amin & Tarun, 2020; Chen et al., 2021). Moreover, Chen et al. (2021) studied "perceived greenness," which is a metric that differentiates green perceived value from perceived value. Given the above, this study will focus on the following metrics of green perceived value: environmental performance, reputation and innovation.

2.4 Green Purchase Intention

As adapted by Chen and Chang (2012), green purchase intention is the willingness, preference and probability of a customer choosing a product that is environmentally friendly and sustainable in nature. This includes being willing to buy the product because it has good environmental performance, prioritizing the product's environmental performance over other features when making purchase decisions, and intending to buy the products as it is perceived to be environmentally favorable (Chen et al., 2020).

2.5 Hypothesis Development

Flavián et al. (2005) suggested brand image positively influences trust. Fianto et al. (2014) also corroborated that brand image has a positive influence on trust. Furthermore, Lien et al. (2015) claimed brand image as having one of the stronger influences on trust, justifying this relationship by explaining that an attractive and overall positive brand image can "diminish the risk of purchase". In addition, Alhaddad (2015) argued that brand image increased consumer's willingness to rely on the brand's ability to "perform its stated function".

H1: Green brand image has a positive influence on green trust.

Lien et al. (2015) confirmed that brand image has a direct and positive impact on perceived value. Tu and Chih (2013) also indicated that corporate brand image significantly affects the customers' perceived value. Huang et al. (2019) also reported the positive and significant correlation between brand image and perceived value, supporting the previous studies. Jeng (2016) justified this by pointing out brand images as the creation of value for customers.

H2: Green brand image has a positive influence on green perceived value.

Previous studies have argued the importance of brand image on purchase intentions, and the consequences of ignoring a poor brand image (Chen et al., 2018). Chen et al. (2018) pointed out brand image as a crucial variable to purchase intentions. Hence, poor brand image reduces purchase intentions. Lien et al. (2015) demonstrated the positive influences brand

image has on purchase intentions through price and value.

H3: Green brand image had a positive influence on green purchase intention.

Ponte et al. (2015) have confirmed the relationship that trust positively affects perceived value for customers in the case of online shops. Jayashankar et al. (2018) also confirmed this relationship in Internet of Things (IoT) adoption in agriculture. Even though this relationship is yet to be studied in green markets, this relationship branches from the idea that more trust in the brand (seller) can reduce non-monetary costs such as the time to browse products, leading to an increase in perceived value. This justification also applies to green products.

H4: Green trust has a positive influence on green perceived value.

Previous studies demonstrated the relationship between green trust and purchase intention varies. Lee (2020) argues green trust does not have a direct impact on purchase intentions. On the other hand, Handi et al. (2018) have suggested that trust positively and significantly influences purchase decisions. Amin and Tarun (2020) also proposed a strong relationship between green trust and green purchase intention taking into account price, performance, quality, social image and emotional association with the product. These factors, in addition to environmental performance, gain and strengthen customer's trust which in turn encourages customers to purchase the product (Yeğin & Ikram, 2022).

H5: Green trust has a positive influence on green purchase intention

From the research conducted by Handi et al. (2018), it has been discovered that perceived value has direct positive and significant effects on purchase decisions if mediated by trust. Moreover, a consumer would be more willing to purchase a product that shows higher perceived value (Kotler & Keller, 2006). The other identified parameter, innovation, has also been found to have a positive influence on green purchase intention (Chen et al., 2021).

H6: Green perceived value has a positive influence on green purchase intention.

3. Methodology

3.1 Questionnaire Design

A survey questionnaire, consisting of two sections, was developed and distributed to collect data. The first section aimed to collect and analyze basic demographic information including gender, age, educational level, their attitude toward environmental issues and how well they know Tesla electric vehicles. The second section employed items based on the proposed

hypotheses to measure green brand image, green trust, green perceived value and green purchase intentions around the basis of the proposed hypotheses. Green brand image was measured using 5 items adopted by Lien et al. (2015) and Park et al. (1986). Green trust was measured using 5 items adopted by Gefen et al. (2003) and Heyns and Rothmann (2015). Green perceived value was measured using 5 items adopted by Sweeney and Sourtar (2001) and Petrick (2002). Green purchase intention was measured using 4 items adopted by Salisbury et al. (2001) and Jalilvand et al. (2011). All 20 items in section two ask respondents to indicate their level of agreement with the statement using the five-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree".

3.2 Data Collection and Data Analysis

This paper used the convenience sampling method to distribute the questionnaires. The research object was based on two criteria. Firstly, respondents were required to indicate their knowledge on Tesla electric vehicles, rating their level of knowledge from 1 being "I have never heard of it" to 5 being "I know a lot about it." Secondly, respondents had to show relative awareness regarding environmental issues, rating their attitude from 1 being "I don't really care about it." to 5 being "I am very passionate about it". To identify our target group, we devised questions to understand respondents' attitudes toward environmental issues as well as their knowledge on Tesla electric vehicles in which valid respondents had to rate both criteria a 2 out of 5 or above.

The methodologies used for data analysis were as follows. Cronbach's Alpha was conducted to investigate the reliability of the constructs. The Average Variance Extracted (AVE) and Construct Reliability (CR) were used to assess the convergent validity and internal consistency, respectively. For this study, the recommended thresholds of Cronbach's Alpha ≥ 0.7 , AVE ≥ 0.5 and CR ≥ 0.7 are applied to the variables. Finally, the structural equation model (SEM) was used to acquire empirical data for testing the hypotheses. The following indexes including Goodness Fit of Index (GFI), Adjusted Goodness Fit of Index (AGFI), Tucker Lewis Index (CFI), Root Mean Square Residual (RMR), and Root Mean Square Error of Approximation (RMSEA) were adopted to evaluate the Goodness of Fit of the proposed model.

4. Results

4.1 Demographic Information of Respondents

The data collected shows that of the 225 respondents of the survey, a majority of 55.1%

were male. Based on the age profile, the age group of 36 - 50 has the most respondents with 48%, followed by those under 20 with 19.6%. Other age groups include 21 - 35 year-olds (14.7%), 51 - 65 year-olds (8%) and 66 year-olds or older (9.8%). The education composition was made of 4 groups, with 41.8% having master's or doctoral degrees, followed by associate's or bachelor's degree accounting for 36% of respondents, then high school with 17.8% and primary or secondary education with 4.4%.

4.2 Confirmatory Factor Analysis

As seen in Table 1, all four constructs are acceptable in reliability and validity. In terms

of convergent validity, the factor loadings of all four variables meet the criteria of a value greater than 0.5. Additionally, the average variance extracted (AVE) ranges from 0.548 to 0.724, meaning all four constructs exceed 0.5. Hence, the convergent validity of the constructs is verified. Table 1 also shows that all values of Cronbach's alpha for the four constructs range from 0.850 and 0.928 which are all above the value of 0.7. Moreover, the construct reliability (CR) of all four constructs exceeds 0.7, ranging from 0.857 to 0.929, demonstrating good internal consistency.

Table 1: Confirmatory Factor Analysis (CFA) Results

Construct	Items	Factor Loading	CR	AVE	Cronbach's alpha
Green Perceived Value	GPV01	0.837	0.857	0.548	0.850
	GPV02	0.625			
	GPV03	0.777			
	GPV04	0.656			
	GPV05	0.785			
Green Trust	GT01	0.817	0.929	0.724	0.928
	GT02	0.812			
	GT03	0.823			
	GT04	0.916			
	GT05	0.882			
Green Brand Image	GBI01	0.758	0.872	0.577	0.883
	GBI02	0.684			
	GBI03	0.758			
	GBI04	0.792			
	GBI05	0.799			
Green Purchase Intention	GPI01	0.865	0.912	0.722	0.911
	GPI02	0.760			
	GPI03	0.864			
	GPI04	0.904			

4.3 Correlation Analysis and Discriminant Validity

The Pearson's correlation coefficients are shown in Table 2. The square root of AVE of each construct is revealed in the diagonal.

Since the square root of AVE for a particular construct is larger than its correlation with any of the other constructs, the discriminant validity is also satisfied.

Table 2: Pearson's Correlation Analysis and Discriminant Validity Results

	Green Brand Image	Green Trust	Green Perceived Value	Green Purchase Intention
Green Brand Image	(0.760)			
Green Trust	0.734*	(0.851)		
Green Perceived Value	0.721*	0.725*	(0.740)	
Green Purchase Intention	0.700*	0.694*	0.701*	(0.850)

*p<0.05

4.4 Structural Equation Model

The data used in this study is considered to be the normality since the absolute value of skewness and the absolute value of kurtosis for all items are smaller than 2; and Mardia coefficient is 135.215 which is smaller than the

product of p and p+2 (i.e. 19*21= 399, p is the total number of items).

Given $\chi^2/df = 2.425$, GFI = 0.854, AGFI = 0.810, NFI = 0.902, CFI = 0.940, RMR = 0.048, RMSEA = 0.080, the goodness-of-fit of the research model exhibits a good fit with the data collected. As presented in Figure 2 and Table 3, green brand image has a positive effect

on green trust and green perceived value; however, brand image has not shown to have a positive effect on green purchase intention. Furthermore, green trust positively influences green perceived value, but does not demonstrate to have a significant positive effect on

green purchase intention. However, the data shows that green perceived value has a positive effect on green purchase intention. Therefore, H1, H2, H4 and H6 are accepted while H3 and H5 are not accepted.

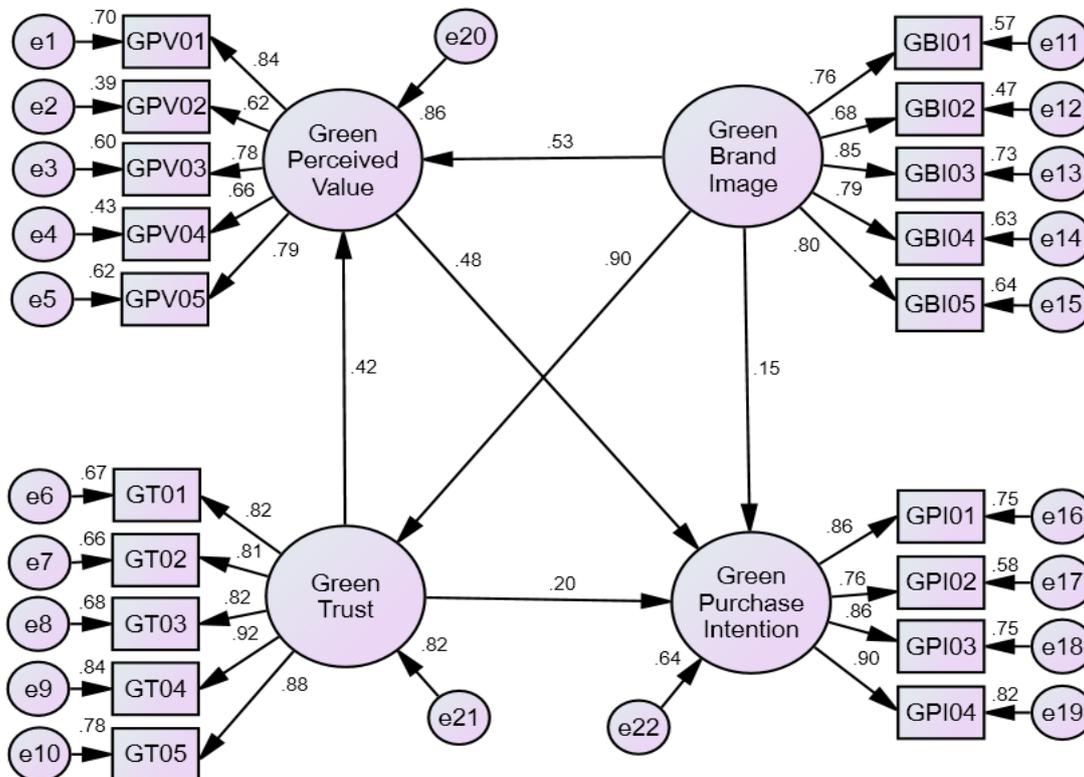


Figure 2: Structural Equation Model (SEM) Results

Table 3: Hypothesis Testing Results of Structural Equation Model (SEM)

Hypothesis	Path	Estimate (confidence intervals)	S.E.	C.R.	P	Results
H1	Green brand image --> Green trust	0.905 (0.853 - 0.947)	0.096	11.488	0.000***	Accepted
H2	Green brand image --> Green perceived value	0.526 (0.216 - 0.924)	0.164	3.884	0.000***	Accepted
H3	Green brand image --> Green purchase intention	0.152 (-0.323 - 0.573)	0.284	0.777	0.437	Not accepted
H4	Green trust --> Green perceived value	0.424 (0.010 - 0.737)	0.129	3.247	0.001**	Accepted
H5	Green trust --> Green purchase intention	0.195 (-0.233 - 0.552)	0.200	1.158	0.247	Not accepted
H6	Green perceived value --> Green purchase intention	0.477 (0.053 - 0.947)	0.241	2.381	0.017*	Accepted

*p<0.05, **p<0.01, ***p<0.001

5. Conclusion

5.1 Discussion of Findings

This study analyzed the relationships among green brand image, green trust, green perceived value and green purchase intention by examining their roles in Tesla electric vehicles in Taiwan. The results corroborate most of the proposed hypotheses showing that green

brand image has a positive influence on green trust and green perceived value. The results also show that green trust positively affects green perceived value while green perceived value has a significant effect on green purchase intention. However, the impact of green brand image and green trust on green purchase intention are both found to be insignificant, and hence their hypotheses were not accepted.

In this study, it has been verified that green brand image plays a significant role in positively influencing green trust. This may be because the customers are more likely to believe in the brand and hence its products if associations toward the brand are more positive. This outcome is consistent with Flavián et al. (2005) and Alhaddad (2015). Additionally, green brand image is an important driver affecting green perceived value. The results are compatible with that of Lien et al. (2015) and Huang et al. (2019). This demonstrates that customers may associate a positive green brand image as an essential attribute that enhances the benefits/ positive attributes of the product, therefore the overall perception of value is higher. Green trust is an important determinant of green perceived value suggesting that believing in the brand and its products means that consumers do not need to worry about risks such as bad functionality or certain defects (Lien et al., 2015). This outcome is consistent with that of Ponte et al. (2015) and Jayashankar et al. (2018). Green perceived value is the only determinant in the study to have a significant effect on green purchase intention. This shows that when customers think they are receiving more than what they lose by purchasing a product, customers are more willing to purchase it because they recognize its value. This finding is concordant with Handi et al. (2018) and Kotler & Keller (2006).

The impact of green brand image on green purchase intentions is surprisingly insignificant. This may be because respondents have varying depths of knowledge on Tesla's brand and it is possible that they know the products well but not the brand itself. Hence, they cannot confirm their willingness to purchase the product solely based on its brand. Additionally, green trust may not have illustrated significant effects on green purchase intentions. A possible justification is that a large degree of trust is based on past experience but it is unclear if respondents have driven Tesla electric vehicles before. Despite the absence of the direct effects of green brand image and green trust on green purchase intention, the positive indirect effect may be present. This suggests that even though green brand image does not greatly and directly influence the willingness of the customer to purchase the Tesla electric vehicles, in the cases where green brand image improves green perceived value, it may increase the green purchase intention of customers. The same analysis applies to the effect of green trust on green purchase intention. This conclusion would also emphasize the importance of perceived value, seeing as it is the bridge in connecting several determinants together. A potential explanation

may be that green perceived value exists independent of prior knowledge on the brand. Given that the majority of respondents (80%) do not have extensive knowledge about the brand, it may be hard for them to make a thorough judgment of whether or not to purchase the green product solely based on the green brand image and green trust. On the other hand, green perceived value is a subjective judgment which can be made by observations; hence it will play a more important role in influencing green purchase intention. However, green brand image and green trust have strong influences over green perceived value indicating that they can shape the amount of value customers place on the products.

5.2 Managerial Implications

As consumers put more focus on green purchasing habits, this study provides Tesla and other businesses in the electric automotive industry theoretical implications to enhance sales and create an effective marketing strategy.

- (1) We have identified green brand image as a significant influence over two of the three determinants investigated. This result emphasizes the idea that even though having a positive green brand image may not directly lead to consumers' intention to buy the products, highlighting the unique attributes of a brand, associated with environmental benefits can improve the quality of customers' personal encounters and experiences with the brand. This suggests that businesses should center marketing campaigns around specific environmental benefits of the product that are different to similar businesses in the industry. Additionally, showing that a brand partakes in environmentally-friendly practices can also help to strengthen the reputation of a brand, enhancing brand image.
- (2) Moreover, green perceived value has been recognized as an essential bridging point between the indirect effects of green brand image and green trust on green purchase intentions. To increase the green perceived value, businesses' development of new products should aim to provide distinctive methods that showcase innovation and highlight the benefits the product can provide. This provision of information about the brand and product should not only be done through product promotion, but also through engaging with a variety of consumer groups, knowing what each group finds most beneficial and most burdensome. Through this, firms can better promote the benefits and minimize the costs perceived by each group.

5.3 Limitations and Further Research

There are three potential extensions of the current research model that can be considered for future research. Firstly, because this research concentrates on Tesla electric vehicles in Taiwan, it cannot be confirmed that the findings are applicable to other countries. Secondly, the research is centered around Tesla which is a brand that is well-known in the electric automotive market, so further research can be conducted on other brands in green markets, especially newer and smaller businesses to reach a more accurate conclusion. Finally, this study also suggests that there may be an indirect effect of green brand image and green trust on green purchase intention if mediated by green perceived value. This could be explored and corroborated in future research.

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