
Based on Environmental Value to Discuss the Effect of Product Design Attitude on Purchase Intention

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Abstract

The overuse of global energy and resources as well as improper handling of environment result in worsening ecological environment and accelerating the exhaustion of resources on which humans rely for survival. Along with the enhancement of people's environmental awareness, humans start to concern about the environment with various environmental protection activities. The regulations and requirements of international organizations and the government have green consumption become a trend. Domestic businesses also design various green products conforming to international environmental protection regulations to respond to consumers' attitudes towards environmental value. Aiming at the public in northern, central, and southern Taiwan, as the research objects, total 500 copies of questionnaire are distributed and 373 valid copies are retrieved, with the retrieval rate 75%. The research results show significantly positive effects of 1.environmental value on product design attitude, 2.product design attitude on purchase intention, and 3.environmental value on purchase intention. According to the results, suggestions are proposed, expecting to do the best for the natural environment and promote green consumption to become the national movement.

Keywords: environmental value, product design attitude, purchase intention, green consumption

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INTRODUCTION

Since Industrial Revolution, the earth-unfriendly behaviors of over-development of the earth and the exhaust emission from factories have resulted in environmental pollution and exhaustion of natural resources. The fundamental changes do not simply damage the natural ecological balance, but also result in global environmental crises. The overuse of global energy and resources and the improper handling of environment have worsened ecological environment and accelerated the exhaustion of resources on which humans rely for survival. The frequent environmental disasters have people perceive the serious environmental crisis. To solve environmental crises, various countries gradually discover that environmental problems involving in the public behaviors cannot be solved by environmental experts; unless people present correct understanding of environment, environmental problems would not be effectively solved. Humans should not ignore the sustained-yield economic development for short-term benefits, the principles of environmental protection and economic development should be emphasized.

Along with people's rising environmental awareness, humans start to concern about environmental protection activities. The regulations and requirements of international organizations and the government have green consumption become a trend. Domestic businesses also design various green products conforming to international environmental protection regulations to respond to consumers' attitudes towards environmental value. In consumers' purchase behaviors, there are psychological and physical activities to affect the purchase decision. Psychological activity contains the inference of information and inner decision-making, and physical activity includes the collection of product-related information and actual product consumption and handling. Consumer value would affect the behaviors. In comparison with other personal traits, value cannot be easily changed. Environmental value is the desired behaviors or outcomes of individual beliefs and principles to the environment which could guide the environmental actions or choices. The effect of the natural environment change has humans enhance the environmental awareness and consumers pay more attention to the environmental protection and energy saving properties of products. When the government

largely promotes the idea of environmental protection, businesses are requested to pay attention to the environmental protection of products and better green product design and consumers should select products which would not easily result in environmental pollution or wastes. Based on environmental value, this study aims to discuss the effect of product design attitude on purchase intention, expecting to do the best for the natural environment and promote the principle of green consumption to become national movement.

LITERATURE REVIEW

Environmental Value

Chen and Hung (2016) regarded individual value orientation of natural environment as the environmental value; individual intrinsic environmental value would affect the environmental attitudes and intrinsic motivation and form the environmental paradigm. Biswas and Roy (2015) referred environmental value as “humans’ beliefs, attitudes, and value system of environment to guide and regulate humans’ environmental behaviors”; besides, environmental value should present the spirit and content of environmental ethics. Thompson and Tong (2016) also pointed out value as the value standard for the appropriateness, importance, and social meanings of an individual judging people, affairs, and objects. In this case, an individual would make value judgment when there were value standards in mind. Apparently, value was a point of view and opinion established through internalization after an individual evaluated people, affairs, and objects, and such a point of view and opinion were the action reference. Knudsen and Nielsen (2016) mentioned that individual value orientation of natural environment was the environmental value, and individual inner environmental value would affect the environmental attitude and form the environmental paradigm. Sörqvist et al. (2015) regarded environmental value as the belief composition of specific situations in environment, overall environment, and people, affairs, and objects directly related to environment. Maichum et al. (2016) stated that environmental attitude could be individual or group behaviors based on the environmental cognition and added the factors of affection and motivation. Snoeren et al. (2016) defined environmental value as individual opinions about the overall environmental value and human responsibility and role in the environment to generate the affection of agreement or disagreement, like or dislike about some affairs related to environment.

By referring to Chen et al. (2017), the following indicators are applied to measure environmental value in this study.

- (1) Egoistic care: including I, my future, my lifestyle, and my health.
- (2) Altruistic care: containing humans, children, next generations, and people in the same community.
- (3) Biospheric care: covering animals, plants, marine life, and birds.

Product Design Attitude

Jiang and Kim (2015) pointed out the critical role of product design in consumers’ communication product use and operation process, as product design was the surface configuration of a product and the mutual arrangement and match of elements to enhance product function, economy, and pleasure. Molina-Besch and Pålsson (2016) referred attitude as the evaluation and state of liking or disliking a specific observation body or the feeling opinion or more persistent and stable evaluation and preference generated from the evaluation of affairs. Afrozet al. (2015) regarded it as individual belief, affection, and behavior tendency about others, affairs, and environment. Attitude referred to an individual being close to specific people, affairs, and objects due to preference and avoiding due to disgust and was stable and learned individual behavioral tendency. Suki (2015) explained it as individual perception, evaluation, feeling, and behavioral tendency agreeing or disagreeing certain affairs or concepts. Brand attitude (or product attitude) was consumer preference for specific brand (or brand). Ceballos et al. (2017) pointed out product design attitude as consumer preference for specific product design; consumer attitude toward certain product design was the comprehensive evaluation of the product design among various brand attributes. Liobikienė et al. (2016) indicated that consumers’ use of products relied on the attitude; consumers would evaluate various product designs before the purchase intention that product design attitude was a key factor in purchase intention.

Referring to Huang et al. (2016), product design attitude contains three dimensions in this study.

- (1) Cognitive component: customers’ perception and knowledge of product design.
- (2) Affective component: customers’ affective reaction to product design.

- (3) Behavioral component: the tendency and possibility of a customer taking specific actions or behaviors or recommendation to others about certain brand product design.

Purchase Intention

Chen et al. (2015) defined purchase intention as the possibility of a consumer being willing to purchase certain product; the higher purchase intention revealed the larger probability of purchase. Nuttavuthisit and Thogersen (2017) regarded purchase intention as the possibility attempting to purchase a product, the probability, possibility, and intention of customers being willing to purchase certain product. Awuni and Du (2016) pointed out purchase intention as individual behavioral tendency to products. Thomson and Crocker (2015) defined purchase intention as consumers' certain transaction behaviors after the overall evaluation of products, i.e. attitudes towards purchase behavior. Magnier and Schoormans (2015) considered that the measurement of purchase intention lied in consumer intention to purchase certain products; the higher purchase intention showed the larger purchase probability. In other words, purchase intention was the possibility of consumers purchasing certain products; the higher purchase intention stood for the larger probability of consumers' purchase. Chekima et al. (2016) indicated that purchase intention was composed of a consumer considering current conditions and possible situations as well as individual judgment of the specific service of a business.

After referring to research on the measurement of consumers' purchase intention, the dimensions for consumers' purchase intention in this study are referred to Lee and Lam (2016) as "considering the purchase", "willing to purchase", and "recommending to others".

Research Hypothesis

Teng and Lu (2016) described that a consumer's selection for specific product purchase was the attitude towards the product design; such product design attitude could satisfy the needs for certain value; and, the needs for the product was consumer value. In other words, Chen et al. (2017) explained that consumer needs for specific products came from the cognition of product design attitude, and such cognition came from the value. Davarzani et al. (2015) mentioned that a product was meaningful to consumers because the design use pursued by consumers matched with certain value, or the physical characteristics of the product design could satisfy the use result pursued by consumers. Olawepo and Ibojo (2015) indicated that

consumers with higher environmental awareness would express their environmental protection attitudes through the purchase of green design products. In other words, product design with environmental protection characteristics was the key factor in the purchase decision. Accordingly, the following hypothesis is proposed in this study.

H1: Environmental value presents significantly positive effects on product design attitude.

Tsai et al. (2016) divided attitudes into general attitude and specific attitude. General attitude could be individual attitudes towards environment, while specific attitude was individual attitudes toward product design. In terms of product design attitude and purchase intention, Dubey et al. (2015) mentioned that the environmental protection characteristics of product design would be taken into account when purchasing products, i.e. consumers' consideration of product design attributes or characteristics in the purchase process and the purchase activity, particularly the purchase of environment-friendly products or green products. Snoeren et al. (2016) mentioned that product design with environmental protection was broadly agreed in the society and gradually included in people's cognition system to regulate individual daily attitudes and behaviors (Huang et al. 2016). In this case, consumers' purchase intention relied on consumer attitudes towards the environmental protection attribute of product design after the evaluation. The following hypothesis is therefore proposed in this study.

H2: Product design attitude shows remarkably positive effects on purchase intention.

Lee and Lam (2016) regarded purchase intention as consumers' considerations of product design related environmental protection attributes or characteristics in the purchase process and the purchase activity, i.e. purchase intention of environment-friendly product design. Hamari et al. (2015) explained green purchase intention as the responsible behavior for environment which would be affected by consumers' environmental value (Chen et al. 2015). For this reason, it is considered in this study that environmental value would affect consumers' information search for product design and the actual purchase intention. Consequently, the following hypothesis is proposed in this study.

H3: Environmental value reveals notably positive effects on purchase intention.

Table 1. Overall linear structure model analysis result

evaluation item	parameter/evaluation standard	result	t	
preliminary fit	environmental value	egoistic care	0.691	9.69**
		altruistic care	0.675	8.46**
		biospheric care	0.659	7.88**
	product design attitude	cognitive component	0.723	11.61**
		affective component	0.688	9.12**
		behavioral component	0.704	10.23**
	purchase intention	considering the purchase	0.734	12.37**
		willing to purchase	0.752	14.16**
		recommending to others	0.747	13.22**

Note: * stands for $p < 0.05$, ** for $p < 0.01$, *** for $p < 0.001$

Table 2. Overall linear structure model analysis result

evaluation item	parameter/evaluation standard	result	t
internal fit	environmental value → product design attitude	0.844	27.53**
	product design attitude → purchase intention	0.856	31.46**
	environmental value → purchase intention	0.871	35.28**

Note: * stands for $p < 0.05$, ** for $p < 0.01$, *** for $p < 0.001$

SAMPLE AND MEASUREMENT INDEX

Research Sample and Object

Aiming at the public in northern, central, and southern Taiwan, as the research objects, total 500 copies of questionnaire are distributed, and 373 valid copies are retrieved, with the retrieval rate 75%.

Test of Reliability and Validity

The questionnaire items applied to this study are referred to domestic and international research that the questionnaire presents certain content validity. The dimensions of environmental value, product design attitude, and purchase intention are tested the overall structural causal relationship. Besides, the linear structural relation model analysis results reveal the overall model fit achieving the reasonable range that it presents favorable convergent validity and predictive validity. Item-to-total correlation coefficients are used for testing the construct validity of the questionnaire, i.e. reliability analysis. The calculated item-to-total correlation coefficients are applied to judge the questionnaire content. The item-to-total correlation coefficients of the dimensions in this study are higher than 0.7, revealing certain construct validity of the questionnaire.

To further understand the reliability of the questionnaire, reliability analysis is preceded in this study. The formal questionnaire is developed according to the standards, and the measured Cronbach's α appears in 0.70~0.90, apparently conforming to the reliability range.

EMPIRICAL RESULT ANALYSIS

LISREL Model Evaluation Index

LISREL (linear structural relation) model, combining factor analysis and path analysis in traditional statistics and adding simultaneous equations in econometrics, could calculate multiple factors and multiple paths. The model fit could be evaluated with preliminary fit criteria, overall model fit, and fit of internal structure of model.

The research data are organized as below. The preliminary fit criteria, internal fit, and overall fit are explained as followings.

Table 1 shows the complete model analysis result. In regard to preliminary fit, three dimensions of environmental value (egoistic care, altruistic care, biospheric care) could remarkably explain environmental value ($t > 1.96$, $p < 0.05$), three dimensions of product design attitude (cognitive component, affective component, behavioral component) could notably explain product design attitude ($t > 1.96$, $p < 0.05$), and three dimensions of purchase intention (considering the purchase, willing to purchase, recommending to others) could significantly explain purchase intention ($t > 1.96$, $p < 0.05$). Apparently, the overall model in this study reveals good preliminary fit criteria.

From **Table 2**, environmental value appears positive and remarkable correlations with product design attitude (0.844, $p < 0.01$), product design attitude shows positive and notable correlations with purchase intention (0.856, $p < 0.01$), and environmental value reveals positive and significant correlations with purchase intention (0.871, $p < 0.01$) that H1, H2, and H3 are supported.

Table 3. Overall linear structure model analysis result

overall fit	χ^2/Df	1.538
	GFI	0.977
	AGFI	0.924
	RMR	0.006

Note: * stands for $p < 0.05$, ** for $p < 0.01$, *** for $p < 0.001$

From **Table 3**, the overall model fit standards $\chi^2/Df=1.538$, smaller than the standard 3, and $RMR=0.006$ present proper results. Moreover, chi-square value is sensitive to sample size that it is not suitable for directly judging the fit. However, the overall model fit standards $GFI=0.977$ and $AGFI=0.924$ are higher than the standard 0.9 (the closer GFI and AGFI to 1, the better model fit) that this model shows good fit indices.

CONCLUSION

The research results show that environmental value would affect consumers' product design attitude. For this reason, consumers would be willing to purchase the product of a business with research and development on the product design; however, the quality and effectiveness should achieve the standards in order not to affect consumers' environmental value. Regarding product design attitude, consumers would consider product energy-saving (egoistic), product environmental protection or government policies (altruistic), but are still lack of natural resource value, which requires the efforts of the government, businesses, and consumers to reinforce the emphasis on environment. A business therefore should, aiming at consumers, design more products and guarantee the quality and environmental protection. Consumers, on the other hand, should search product attributes and the hazard to human bodies when purchasing products. Not paying attention to the damage to environment reveals inadequate national education and government promotion of natural environment.

SUGGESTION

From the important research results and findings, the following practical suggestions are proposed in this study.

1. Good environmental value is the positive group in product design attitude, and the cultivation of

such value should start from family, the basic unit in the society. The government and schools should promote the idea of green environmental protection to cultivate good environmental value from childhood. Schools, matching with government policies, should regularly hold environmental protection contests to encourage students' automatic environmental protection concept.

2. Governmental institutions should implement green spirit by stopping or punishing bad environmental protection behaviors with regulations. The government should make determination to promote green concepts with legislations, largely promote various environmental protection and energy labels to reinforce the public product design attitude and environmental protection purchase intention.
3. With rising environmental awareness, consumers start to emphasize the environmental protection design of products. The government plays a critical role in the promotion and advance. Enterprises or the government could provide special offers for consumers purchasing green product design, e.g. energy saving subsidies and trade-in for replacing old articles with new ones. Regarding the product design and function, an enterprise should guarantee the product function and quality and the government should authorize environmental protection labels by actually testing the product design conforming to the environmental protection so as to recall consumers' confidence. Furthermore, an enterprise should develop new environmental protection product design or materials for more choices in order to reduce damage to environment and provide people with better life.

REFERENCES

- Afroz R, Masud MM, Akhtar R, Islam MA, Duasa JB (2015) Consumer purchase intention towards environmentally friendly vehicles: an empirical investigation in Kuala Lumpur, Malaysia. *Environmental science and pollution research international*, 22(20): 16153.
- Awuni JA, Du J (2016) Sustainable consumption in Chinese cities: green purchasing intentions of young adults based on the theory of consumption values. *Sustainable Development*, 24(2): 124-135.
- Biswas A, Roy M (2015) Green products: an exploratory study on the consumer behaviour in emerging economies of the East. *Journal of Cleaner Production*, 87: 463-468.
- Ceballos G, Ehrlich PR, Dirzo R (2017) Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines. *Proceedings of the National Academy of Sciences*, 114(30): E6089-E6096.
- Chekima B, Chekima S, Syed Khalid Wafa SAW, Igau OA, Sondoh Jr SL (2016) Sustainable consumption: the effects of knowledge, cultural values, environmental advertising, and demographics. *International Journal of Sustainable Development & World Ecology*, 23(2): 210-220.
- Chen SC, Hung CW (2016) Elucidating the factors influencing the acceptance of green products: An extension of theory of planned behavior. *Technological Forecasting and Social Change*, 112: 155-163.
- Chen YS, Hung ST, Wang TU, Huang AF, Liao YW (2017). The influence of excessive product packaging on green brand attachment: the mediation roles of green brand attitude and green brand image. *Sustainability*, 9(4): 1-15.
- Chen YS, Lin CY, Weng CS (2015) The influence of environmental friendliness on green trust: The mediation effects of green satisfaction and green perceived quality. *Sustainability*, 7(8): 10135-10152.
- Davarzani H, Fahimnia B, Bell M, Sarkis J (2015) Greening Ports and Maritime Logistics: A Review of the Literature of Green Ports and Maritime Logistics. In *Green Logistics and Transportation*, pp. 149-158. Springer International Publishing.
- Dubey R, Gunasekaran A, Ali SS (2015) Exploring the Relationship between Leadership, Operational Practices, Institutional Pressures and Environmental Performance: A Framework for Green Supply Chain. *International Journal Production Economics*, 160: 120-132.
- Hamari J, Sjöklint M, Ukkonen A (2015) The sharing economy: Why people participate in collaborative consumption. *Journal of the Association for Information Science and Technology*, 67(9): 2047-2059.
- Huang XX, Hu ZP, Liu CS, Yu DJ, Yu LF (2016) An Examination of Corporate Reporting Environmental Management Practices and Firm Performance. *Journal of Cleaner Production*, 112: 3456-3433.
- Jiang Y, Kim Y (2015) Developing multi-dimensional green value: Extending social exchange theory to explore customers' purchase intention in green hotels—evidence from Korea. *International Journal of Contemporary Hospitality Management*, 27(2): 308-334.
- Knudsen HH, Nielsen SB (2016) Housing organizations using social media in sustainable building operation - a review of eighteen Danish cases. In P. Anker Jensen (Ed.), *Proceedings of the CFN Second Nordic Conference, Polyteknisk*.
- Lee PTW, Lam JSL (2016) Developing the Fifth Generation Ports Model. In *Dynamic Shipping and Port Development in the Globalized Economy*, pp. 186-210, Palgrave Macmillan UK.
- Liobikienė G, Mandravickaitė J, Bernatoniene J (2016) Theory of planned behavior approach to understand the green purchasing behavior in the EU: A cross-cultural study. *Ecological Economics*, 125: 38-46.
- Magnier L, Schoormans J (2015) Consumer reactions to sustainable packaging: The interplay of visual appearance, verbal claim and environmental concern. *Journal of Environmental Psychology*, 44: 53-62.
- Maichum K, Parichatnon S, Peng KC (2016) Application of the Extended Theory of Planned Behavior Model to Investigate Purchase Intention of Green Products among Thai Consumers. *Sustainability*, 8(10): 1077.
- Molina-Besch K, Pålsson H (2016) A Supply Chain Perspective on Green Packaging Development-Theory versus Practice. *Packaging Technology and Science*, 29(1): 45-63.
- Nuttavuthisit K, Thøgersen J (2017) The importance of consumer trust for the emergence of a market for green products: The case of organic food. *Journal of Business Ethics*, 140(2): 323-337.
- Olawepo GT, Ibojo BO (2015) The Relationship between Packaging and Consumers Purchase Intention: A Case Study of Nestlé Nigeria Product. *International Business and Management*, 10(1): 72-81.

- Snoeren MM, Raaijmakers R, Niessen TJ, Abma TA (2016) Mentoring with (in) care: A co-constructed auto-ethnography of mutual learning. *Journal of Organizational Behavior*, 37(1): 3-22.
- Sörqvist P, Haga A, Langeborg L, Holmgren M, Wallinder M, Nöstell A (2015) The green halo: mechanisms and limits of the eco-label effect. *Food Qual. Prefer*, 43: 1-9.
- Suki NM (2015) Consumer environmental concern and green product purchase in Malaysia: structural effects of consumption values. *Journal of Cleaner Production*, 30: 1-11.
- Teng C-C, Lu C-H (2016) Organic food consumption in Taiwan: motives, involvement, and purchase intention under the moderating role of uncertainty. *Appetite*, 105: 95-105.
- Thompson A, Tong X (2016) Factors influencing college students' purchase intention towards Bamboo textile and apparel products. *International Journal of Fashion Design, Technology and Education*, 9(1): 62-70.
- Thomson DM, Crocker C (2015) Application of conceptual profiling in brand, packaging and product development. *Food Quality and Preference*, 40: 343-353.
- Tsai HL, Lu CS, Chang CC (2016). The Influence of Organisational Green Climate on Employee' Green Behaviours: Evidence from the Eco Port of Kaohsiung. *International Journal of Shipping and Transport Logistics*, accepted.