Green Technology Trends: Increasing Sales of Green Technology through Brand Equity and Green Trust

Ivan Diryana Sudirman, Dimas Yudistira, Mulyani

Abstract: The problem currently faced by green technology is competition with non-environmental friendly technology. One reason for the difficulty of green technology competing with conventional products is the selling price which is relatively more expensive. This paper tried to resolve the issue by studying the links between brand equity, green customer trust and purchase intention. Respondents in this study were young people who have bought green products. The data then processed using partial least square to study the relationship between variables. The results of this study showed a significant relationship between the independent variables with the dependent variable. This showed that companies need to pay attention to brand equity and green customer trust to increase purchase intention.

Keywords : green technology, green product, brand equity, green trust, purchase intention

I. INTRODUCTION

The term technology in green technology refers to the application of knowledge for practical purposes. The field of "green technology" encompasses a continuously evolving group of methods and materials, from techniques for generating energy to non-toxic cleaning products. Example in green technology are energy, green building, environmentally preferred purchasing, green chemistry and green nanotechnology[1].

Other term for green technology is environmental technology. Which is the application of one or more of environmental science, green chemistry, environmental monitoring and electronic devices to monitor, model and conserve the natural environment and resources, and to curb the negative impacts of human involvement.

The term is also used to describe sustainable energy generation technologies such as photovoltaics, wind turbines, bioreactors, etc. Sustainable development is the core of *environmental technologies*. The term *environmental technologies* is also used to describe a class of electronic devices that can promote sustainable management of resources[2].

Based on the previous description, it can be seen that green technology is related to technology products that consider the environment, including electronic products. This means we can use the term green product as an approach to green technology. In this study, green products are also used as an approach to green technology

If green technology is also seen as a green product, then green marketing must be considered in offering green technology to markets. Green marketing is becoming a very important issue today due to climate change and other environmental problems. Green marketing refers to the transaction of products or services on the foundation of their environmental and ecological benefits. Such a product or service may itself be an environmentally friendly product or service, or it may be manufactured and/or packed in an environmentally friendly manner [3]. Hence green marketing also includes transactions from green technology purchasing.

Various attempts is made by the government and companies to help overcome this environmental problem. The Indonesian government is actively run various campaigns related to environmental issues. Joko Widodo, as President of Indonesia on various occasions often asks the people of Indonesia and also other country leaders to solve this environmental problem together.

Bandung, which is the capital of one of the provinces in Indonesia, is intensively conducting several environmental campaigns such as the campaign for reducing plastic waste. Today plastic bag is not free anymore, people must several hundred rupiah if they want to use a plastic bag for their grocery. A side from the government, many private companies also launch products with attention to its impact on the environment. However green product meets problems with its sales because its price is more expensive than conventional products. Even though people are conscious of the environment but because the price is more expensive, they reluctant to buy a product with a green attribute.

If the goods are more costly, customers will have less chance of buying green products [4], [5]. That include green technology in this research. Marketers need to be concerned about whether customers perceive the greenness of their products, they must remember that customers are unlikely to compromise on conventional product attributes, such as value, quality, price, and performance. Green products including green technology must match up on those attributes alongside non-green products to draw consumers [6]

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Even with the term of green technology but the greenness that included in a product such as green technology cannot ensure their sales are extraordinary indeed within today's green era [6].

Furthermore, awareness and knowledge of today's environment conditions do not mean people will act in an ecological way [7]. However this might not be a case in the United State, environmental awareness and customer attitudes towards the purchase of green apparel goods will be greater for US customers as they have already become aware of environmental issues and have more understanding of the environment which improves environmental attitudes. Lack of knowledge about the environment constitutes a significant barrier to positive attitudes to certain environmental issues. [8]. These conditions may occur because America is a more advanced country with a better economic level compare to Indonesia.

Higher prices for green products including green technology cannot be avoided because the technology must pass quality assessment regarding their performance on the environment. For pro-environmentalist people, they look for products and services that are compatible with their values system and typically are ready to pay higher prices for such transactions [9]. On the contrary, because of the price is expensive customer with less social status may not favor green products than those with a higher social condition [10]. The problem is, in Indonesia there are only a few people can afford expensive product.

Customers are reluctant to pay more and are often reluctant to see the benefit of less popular eco-friendly products. Thus the way around this problem is to study brand equity and customer trust and their relationship on green product purchase intention. Customers are willing to pay a premium price for a product that has high brand equity, the willingness to pay the premium price can be one of the parameters of brand equity [11]. In addition to brand equity, customer trust is also studied because green products must be trusted by consumers regarding their performance on the environment.

II. LITERATURE REVIEW

The brand equity is a collection of the brand asset, its name or its logo, which increases or decreases the value given to the business or consumer by a product or service [12]. Keller [13] proposes the concept of brand equity based on the customer in which brand equity can be viewed from the customer perspective. According to Keller, brand equity is the difference between brand insight and the consumer reaction to the marketing efforts of the product in which company awareness is generated through brand and brand concern.

Commonly used concepts of consumer trust come from Moorman, C., Zaltman, G. and Deshpande, R [14] which states that trust is the willingness to rely upon trusted partners. According to Sirdersmukh, Singh, and Sabol [15], consumer trust is the delivery of services as promised and assured that can be expected from a service provider. They conceptualized customer confidence as a multi-faceted concept including the actions of front-line employees and management policies.

In general, the definition of the customer's trust is not much different from each other, which is the willingness of the parties to rely on the other party. However, the definition of green trusts proposed by [16], which is the willingness to rely on products, services or brand that are the result of credibility, virtue, and ability of the products relating to its performance on the environment is more suitable for this research. The definition emphasizes an environmentally friendly feature that differentiates between green products and conventional products. Ajzen's [17] theory of planned behavior is the basis of the idea of the intention to buy. In general purchase intention will transcend to actual purchase if people have a keen intention to buy the product. Intentions are assumed to be reflecting motivation to doing a certain type of behavior. Intentions often show the amount of effort you should make to perform your actions and to try. In the field of social commerce, purchase intention relates to consumers' intention to take part in online purchases from the e-vendors online purchase of social trading sites [18]. Intention has been showed to be a convincing predictor of the actual behavior [19]. Since actual behaviors are usually problematic to measure, it is quite normal to measure the behavioral intention as a replacement to some actual behaviors [20]. On this basis, purchasing intention can be considered as representing the behavioral outcomes of consumers. There are several studies that show the relation between brand equity and purchase intention. To name a few Bittar [21] investigates factors that are important to leverage remanufactured sales, brand equity and price using structural equation modeling. The study shows how brand equity is significantly influenced by purchase intention. Other studies such as Moradi and Zarai [22], Huang et al [23] also concludes brand equity does have a positive impact on purchase intentions. In the field of online commerce, the relationship between customer trust and purchase intention is very often studied. As an example, Thamizhvanan and Xavier [24] found that higher online customer trust leads to higher online buying intent. Customer trust positively affects the purchasing intentions of consumers [25]. Trust has a significant influence on the purchase and re-purchase intention of the customers [26]. However there are no research was carried out to test how brand equity and green customer trust influence the purchase intention of green products, at least to the authr's knowledge. It is important to examine the relationship between those variables with purchase intention in order to have a better understanding of customer behavioral intention toward green products. Based on the above discussion, the model and hypothesis relationship of this research is shown in figure 1. The model use brand equity and green customer trust as independent variables. We examined how these two variables influence purchase intention.
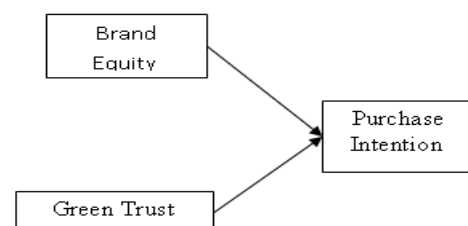

Figure 1. Research Model

III. METHODOLOGY

The method of this study was a causative descriptive analysis because it measures the relationship between the observed variables.

The variables used in this study ware brand equity, customer trust, and purchase intention. Brand equity and customer trust ware the independent variables meanwhile purchase intention was the dependent variable.

Green Trust was derived from Chen measurement which are:

- Reliability of the technology related to its environmental friendliness attribute
- Technology environmental friendliness attribute can be trusted
- The quality of ecolabel of the products corresponds to the expectations
- Technology deliver on their environmental promise.

For brand equity dimension we used Aaker's [12] dimension which is brand loyalty, brand awareness, brand association, perceived quality. As for purchase intention, we measured using the following indicator:

- Willingness to purchase
- Have the desire to purchase

All the variables indicators were assessed by Likert scale 1 to 5 in this analysis. 1 indicates strongly disagree while 5 indicates strongly agree. The population of this study was the population of young people in Bandung that had bought green technology product. The research samples were 120 respondents and the sampling techniques used was purposive sampling. The technique being used was partial least square, the proposed model and its hypotheses were tested using a partial least squares (PLS) structural model, which permitted us to avoid assumptions regarding multicollinearity associated with ordinary minimum square regression or structural covariance-based equation modeling. However, we were still able to analyze the structure using latent variables instead of reducing the constructs to average scores [9].

IV. RESULT AND DISCUSSION

First, using SmartPLS 3 we could see the outer loadings of the purposed model. From table 1 below, most of the indicators were valid except green trust 1 which was below 0.7. But considering the value of the indicators loading factor was not too far from the minimum 0.7 thus we kept the indicator for further analysis.

Table I. Outer Loadings

	Brand Equity	Green Custom...	Purchase Inten...
Brand Equity 1	0.875		
Brand Equity 2	0.931		
Brand Equity 3	0.858		
Brand Equity 4	0.893		
Green Trust 1		0.692	
Green Trust 2		0.861	
Green Trust 3		0.843	
Green Trust 4		0.836	
Intention 1			0.948
Intention 2			0.962

Table II below were the construct reliability and validity. From the table, we could observe that all variables were valid and reliable.

Table II. Construct reliability and validity

	Cronbach's Al...	rho_A	Composite Rel...	Average Varian...
Brand Equity	0.913	0.924	0.938	0.792
Green Custom...	0.838	0.887	0.884	0.658
Purchase Inten...	0.904	0.919	0.954	0.912

For model fit, the SRMR was 0.067 which was fit enough because the number was less than 0.10 or 0.08. [27] introduce the SRMR as a goodness of fit measure for PLS-SEM that can be used to avoid model misspecification. For the d_ULS and d_G, values we must compare it against the confidence interval. The d_ULS was below 95% of d_ULS and d_G was less than 95% of d_G. NFI from the result was 0.831 and less than 0.9 which means the model was a poor fit but the value was close to 0.9.

After analyzing the data, we could see the result in figure 2 below.
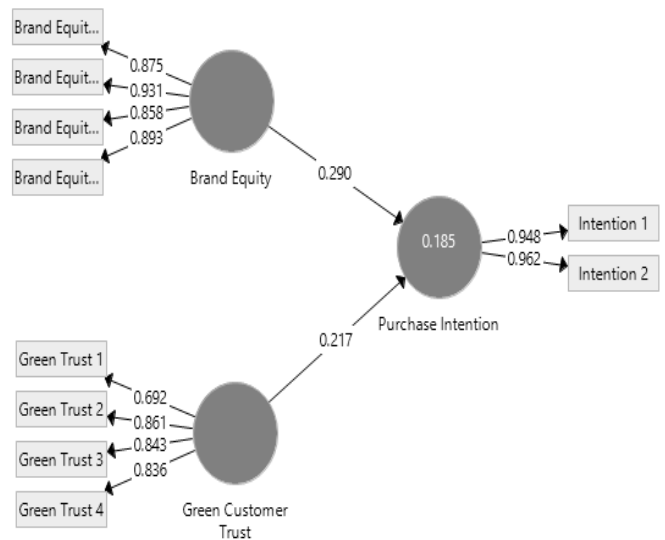

Figure II. Result from SmartPLS

The result showed that brand equity had a bigger effect on purchase intention, but we could not neglect the effect of green trust because there were not many differences between those two variables. Brand equity was 29,2% and green trust was 21,7%. Both independent variables needed to be considered by marketers in order to increase the purchase intention, strong intention can lead to actual purchase. For the R square result, it was good enough for social research because it is quite hard to predict human behavior. Bootstrapping also conducted using SmartPLS 3 and we could observe the result below in table 4.

Table IV. Path Coefficients

	Original Sampl...	Sample Mean (...	Standard Devia...	T Statistics (|O...	P Values
Brand Equity -...	0.290	0.286	0.083	3.486	0.001
Green Custom...	0.217	0.237	0.075	2.896	0.004

From the bootstrapping result, we could see that the effect of brand equity on purchase intention was significant. The effect of green customer trust to purchase intention was also significant.

V. CONCLUSION

From the results, we have drawn the following conclusions. Both independent variables, brand equity, and green trust had a significant impact on green product purchase intention. According to the beginning of the discussion, consumers are reluctant to buy green products. One of the main reason is that most green product price is higher than the conventional product that does not consider environmental impact in their product.

Lowering the price for the green product is not easy this is because of the nature of the green product. Product with environmentally friendly attributes must pass certain specifications before it can claim to be an environmentally friendly product. Thus making it hard for the company to produce products that are cheaper than environmentally friendly products

One way to work around that problem, based on this research is to work on brand equity while maintaining customer trust in the greenness of the product. A company cannot rely on the greenness of its product alone, because with the environmentally friendly attributes does not guarantee product sales will increase [6]. When consumers need to make a choice between product attributes and product greenness, they would perhaps select product attributes rather than product greenness [28].

A company must consider enhancing its brand equity along with its green campaign in order to increase sales. This can be done by putting more effort to increase brand loyalty, increase on brand awareness, better brand associations and good perceived quality. Along with increasing customer trust by increasing its reliability on the environmental friendliness attribute, trust, performance and promises related to the green attribute of the technology.

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REFERENCES

1. "Green Technology - What is it?," Green Technology. .
2. "Environmental technology," Wikipedia. 21-Oct-2019.
3. Rehman, A, "Green values and buying behaviour of consumers in Saudi Arabia: an empirical study," p. 11, 2017.
4. C. D'Souza, M. Taghian, and P. Lamb, "An empirical study on the influence of environmental labels on consumers," Corp. Commun. Int. J., Apr. 2006.
5. C. Gan and H. Kao, "Consumers' purchasing behavior towards green products in New Zealand," Innov. Mark., vol. 4, no. 1, p. 11, 2008.
6. Y. Chen and C. Chang, "Enhance green purchase intentions: The roles of green perceived value, green perceived risk, and green trust," Manag. Decis., vol. 50, no. 3, pp. 502–520, Mar. 2012.
7. J. Pickett-Baker and R. Ozaki, "Pro-environmental products: marketing influence on consumer purchase decision," J. Consum. Mark., vol. 25, no. 5, pp. 281–293, Aug. 2008.
8. S. Bong Ko and B. Jin, "Predictors of purchase intention toward green apparel products: A cross-cultural investigation in the USA and China," J. Fash. Mark. Manag. Int. J., vol. 21, no. 1, pp. 70–87, Mar. 2017.
9. J. D. Oliver and S. Lee, "Hybrid car purchase intentions: a cross-cultural analysis," J. Consum. Mark., vol. 27, no. 2, pp. 96–103, Mar. 2010.
10. I. Ghazali et al., "Green Product Preferences with Respect to Cultural Influences: Empirical Study in Indonesia," Int. J. Autom. Technol., vol. 12, no. 6, pp. 842–852, Nov. 2018.
11. C. Veloutsou, G. Christodoulides, and L. de Chernatony, "A taxonomy of measures for consumer-based brand equity: drawing on the views of managers in Europe," J. Prod. Brand Manag., vol. 22, no. 3, pp. 238–248, May 2013.
12. D. A. Aaker, Managing Brand Equity. Simon and Schuster, 2009.
13. K. L. Keller, Building Customer-based Brand Equity: A Blueprint for Creating Strong Brands. Marketing Science Institute, 2001.
14. C. Moorman, G. Zaltman, and R. Deshpande, "Relationships between providers and users of market research: The dynamics of trust within and between organizations," J. Mark. Res., vol. 29, no. 3, pp. 314–328, 1992.
15. D. Sirdeshmukh, J. Singh, and B. Sabol, "Consumer Trust, Value, and Loyalty in Relational Exchanges," J. Mark., vol. 66, no. 1, pp. 15–37, Jan. 2002.
16. Y. Chen and C. Chang, "Towards green trust: The influences of green perceived quality, green perceived risk, and green satisfaction," Manag. Decis., vol. 51, no. 1, pp. 63–82, Feb. 2013.
17. I. Ajzen, "The theory of planned behavior," Organ. Behav. Hum. Decis. Process., vol. 50, no. 2, pp. 179–211, Dec. 1991.
18. C. Liu, Z. Bao, and C. Zheng, "Exploring consumers' purchase intention in social commerce: An empirical study based on trust, argument quality, and social presence," Asia Pac. J. Mark. Logist., vol. 31, no. 2, pp. 378–397, Apr. 2019.
19. V. Venkatesh and F. D. Davis, "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies," Manag. Sci., vol. 46, no. 2, pp. 186–204, 2000.
20. H. Zhang, Y. Lu, S. Gupta, and L. Zhao, "What Motivates Customers to Participate in Social Commerce? The Impact of Technological Environments and Virtual Customer Experiences," Inf Manage, vol. 51, no. 8, pp. 1017–1030, Dec. 2014.
21. A. de V. Bittar, "Selling remanufactured products: Does consumer environmental consciousness matter?," J. Clean. Prod., vol. 181, pp. 527–536, Apr. 2018.
22. H. Moradi and A. Zarei, "The Impact of Brand Equity on Purchase Intention and Brand Preference-the Moderating Effects of Country of Origin Image," Aust. J. Basic Appl. Sci., vol. 5, pp. 539–545, Mar. 2011.
23. Y.-C. Huang, M. Yang, and Y.-C. Wang, "Effects of green brand on green purchase intention," Mark. Intell. Plan., vol. 32, no. 3, pp. 250–268, Apr. 2014.

24. A. Thamizhvanan and M. J. Xavier, "Determinants of customers' online purchase intention: an empirical study in India," J. Indian Bus. Res., vol. 5, no. 1, pp. 17–32, Mar. 2013.
25. A. Schlosser, T. White, and S. Lloyd, "Converting Web Site Visitors into Buyers: How Web Site Investment Increases Consumer Trusting Beliefs and Online Purchase Intentions," J. Mark. Am. Mark. Assoc. ISSN, vol. 70, pp. 133–148, May 2006.
26. H. Semuel and S. S. Chandra, "The Analysis of Corporate Social Responsibility Implementation Effects towards Price Fairness, Trust and Purchase Intention at Oriflame Cosmetics Product in Surabaya," Procedia - Soc. Behav. Sci., vol. 155, pp. 42–47, Nov. 2014.
27. J. Henseler, C. M. Ringle, and M. Sarstedt, "A new criterion for assessing discriminant validity in variance-based structural equation modeling," J. Acad. Mark. Sci., vol. 43, no. 1, pp. 115–135, Jan. 2015.
28. J. Ginsberg and P. Bloom, "Choosing the Right Green Marketing Strategy," MIT Sloan Manag. Rev., vol. 46, Sep. 2004.

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